3 1761 05293533 5

WILLIAMSON
& Co
KING ST WEST
TORONTO

THE VETERINARY PHARMACOPŒIA, MATERIA MEDICA, AND THERAPEUTICS.

THE VETERINARY PHARMACOPŒIA, MATERIA MEDICA, AND THERAPEUTICS.

BY

GEORGE GRESSWELL,

GRADUATE IN HONOURS, AND LATE OPEN COLLEGE EXHIBITIONER, OF CHRIST CHURCH, OXFORD; GRADUATE OF THE UNIVERSITY, AND LATE LECTURER IN PHYSICAL SCIENCE AT THE DIOCESAN COLLEGE, CAPE OF GOOD HOPE; ETC.

AND

CHARLES GRESSWELL, M.R.C.V.S.,

LATE DEPUTY-EXAMINER ROYAL COLLEGE OF VETERINARY SURGEONS; AUTHOR OF MANY CONTRIBUTIONS TO THE SCIENCE OF VETERINARY MEDICINE AND SURGERY.

WITH DESCRIPTIONS OF THE PHYSIOLOGICAL ACTION OF MEDICINES,

BY

ALBERT GRESSWELL, B.M., Oxon.,

GRADUATE IN HIGH HONOURS, CHRIST CHURCH, OXFORD; AUTHOR OF "A MANUAL OF THE THEORY AND PRACTICE OF EQUINE MEDICINE," ETC., ETC.

21/2/06
6886

PARIS - LONDON - MADRID
MENS SANA CORPORE SANO

5/10/05

LONDON:
BAILLIÈRE, TINDALL AND COX,
KING WILLIAM STREET, STRAND.

[*All Rights Reserved.*]

Digitized by the Internet Archive
in 2007 with funding from
Microsoft Corporation

http://www.archive.org/details/veterinarypharma00gresuoft

TO HIS GRACE

THE DUKE OF PORTLAND,

MASTER OF THE HORSE,

This Work

IS,

IN ACCORDANCE WITH GRACIOUS PERMISSION,

VERY GRATEFULLY AND VERY RESPECTFULLY INSCRIBED

BY

THE AUTHORS.

'Death lies on her, like an untimely frost
Upon the sweetest flow'r of all the field.'

SHAKESPEARE.

'It has been observed that a dwarf, standing on the shoulders of a giant, will see further than the giant himself; and the moderns, standing on the vantage-ground of former discoveries, and uniting all the fruits of the experience of their forefathers with their own actual observation, may be admitted to enjoy a more enlarged and comprehensive view of things than the ancients themselves.'—COLTON.

'Two principles govern the moral and intellectual *world*. One is perpetual progress, the other the necessary limitations to that progress. If the former alone prevailed, there would be nothing steadfast and durable on earth, and the whole of social life would be the sport of winds and waves. If the latter had exclusive sway, or even if it obtained a mischievous preponderancy, everything would petrify or rot. The best ages of the world are always those in which these two principles are the most equally balanced. In such ages every enlightened man ought to adopt both principles into his whole mind and conduct, and with one hand develop what he *can*, with the other restrain and uphold what he *ought*.'
—GENZ.

'For life is not to live, but to be well.'—MARTIAL.

PREFACE.

THIS work will, we think, bring up the subjects of which it treats to the present standard of knowledge. Though we are far from claiming to have exhausted the subject of Veterinary Medicines, we believe that we have supplied a want which has been greatly felt alike by the practitioner and the student.

So far as has been possible, we have endeavoured to work on the lines of 'The British Pharmacopœia' of 1885, and from this admirable work we have therefore of necessity borrowed somewhat largely.

In addition to 'The British Pharmacopœia,' to which our acknowledgments are primarily and chiefly made, we have mentioned various other sources of information as having been consulted in greater or less degree.

It will be seen that much of the therapeutics is original. This portion of our work has been very carefully overlooked by Dr. Albert Gresswell, who has also made many important and most valuable suggestions and additions. A great deal of the information has been derived from the extensive practical experience of the late Mr. D. Gress-

well, F.R.C.V.S., Mr. Charles Gresswell, M.R.C.V.S., and Mr. James Brodie Gresswell, M.R.C.V.S.; and the cases referred to have occurred at different times, stretching over a period of nearly half a century. For some of the modes of preparation we are indebted to the formulæ and suggestions of Mr. Edmund Gresswell.

It is with the cordial hope that this work may prove a real boon to the profession, and may help it on in its steady and sure progress to the high position it should rightfully hold in the scientific world and in the public mind, that we subscribe ourselves,

GEORGE GRESSWELL,
Kelsey House, Louth, Lincolnshire.

CHARLES GRESSWELL,
26, Regent Street, Nottingham.

ALBERT GRESSWELL, B.M., Oxon.
Kelsey House, Louth, Lincolnshire.

October 6th, 1886.

LIST OF WORKS CONSULTED.

'The British Pharmacopœia,' 1885.

Notes, Articles and Records of the late Mr. D. Gresswell, F.R.C.V.S.

'Veterinary Medicines.' By Finlay Dun, F.R.C.V.S., etc.

'A Manual of Equine Medicine.' By Messrs. J. B. and A. Gresswell.

'The Veterinary Journal.' Edited by Dr. Fleming, LL.D., F.R.C.V.S., etc.

'Veterinary Pharmacology and Therapeutics.' By J. B. Gresswell, M.R.C.V.S., etc.

'Veterinary Pharmacopœia.' By Richard V. Tuson, F.I.C., F.C.S., etc.

'A Text-Book of Pharmacology, Therapeutics, and Materia Medica.' By T. Lauder Brunton, M.D., D.Sc., F.R.S. 1885.

'Materia Medica and Therapeutics.' By J. Mitchell Bruce, M.A., M.D., etc.

'Vegetable Materia Medica.' By George S. V. Wills, F.L.S., etc.

'The Essentials of Materia Medica and Therapeutics.' By A. B. Garrod, M.D., F.R.S., etc.

'The Equine Hospital Prescriber.' By Messrs. J. B. and A. Gresswell.

'The Bovine Prescriber.' By Messrs. J. B. and A. Gresswell.

'Diseases and Disorders of the Horse.' By Messrs. Gresswell.

MATERIA MEDICA AND THERAPEUTICS.

ACACIÆ GUMMIS.

Gum Acacia.

Synonyms.—Acaciæ Gummi; Gum Arabic.

Natural Order.—The acacia-tree belongs to the Leguminosæ (Mimoseæ).

Chemical Composition.—Gum acacia consists of *arabin* or *arabic acid*, or *gummic acid*, whose formula is $C_{12}H_{22}O_{11}$, combined with calcium, and in smaller amounts with potassium and magnesium.

Characters.—Gum acacia is a gummy exudation from the stem and branches of *Acacia Senegal*, and other species of acacia. It occurs in roundish, ovoid, or vermicular tears or masses varying in size from about half an inch to about an inch in length, or in angular fragments with shining surfaces. The separate pieces or tears glisten, and may be colourless, yellowish, brownish, or reddish. They may be either more or less transparent, compact, and not easily broken; or opaque, owing to the existence of numerous minute cracks, which also render them very brittle. The fractured surfaces of the spheroidal fragments in which gum acacia occurs, especially possess a vitreous appearance. The taste is bland and mucilaginous, and there is no odour. The gum is insoluble in alcohol, but entirely soluble in

water, forming a clear mucilaginous solution, very well suited for adhesive purposes.

Tests :—

Positive.—An aqueous solution forms, with solution of subacetate of lead, an opaque, white gelatinous precipitate.

Negative.—If a solution of iodine is added to the powder or to a cold solution, no violet or blue colour is produced, unless the specimen has been adulterated with starch.

Preparation.—Mucilago acaciæ.

Uses.—The aqueous solution is used for adhesive purposes, while the mucilage is employed to suspend powders.

Therapeutics.—Mucilage of gum acacia is useful as a demulcent and emollient in coughs, sore throat, and also in cases of irritation of the stomach and intestines, due to inflammation, or the ingestion of poisons. It is also useful as a matrix for preparing fluids to be injected into the bowels and bladder, in cases of inflammation of these organs, for which purposes starch or linseed gruel is equally suitable.

Posology.—The dose of gum acacia is immaterial :

Horses and cattle	... 2 ounces or more.
Sheep ...	... 1 ounce.
Dogs ...	... 30 grains.

ACETUM.

Vinegar.

Chemical Composition.—An acid liquid which contains 5·41 per cent. of real acetic acid, $HC_2H_3O_2$.

Mode of Preparation.—From malt and unmalted grain by the acetous fermentation, and also by subjecting wine to the action of atmospheric oxygen. The wine is made to trickle downwards in a thin stream through a large oaken tube filled with beech chips, a current of air being forced

upwards through the chips. Wood vinegar is prepared from the lighter parts of the crude distillate, obtained by heating wood in closed vessels.

Characters.—Vinegar is a brown liquid, possessing a characteristic odour, and an average specific gravity of 1·018.

Impurities.—*Sulphuric acid,* a little of which is, however, said to make it keep better. The presence of one part of sulphuric acid in 1,000 of vinegar is legal. *Lead,* from the vessels in which it is kept.

Tests :—

Negative.—The absence of lead or certain other metallic impurities may be proved by the fact that the gas, sulphide of hydrogen, when added to it in excess, either as a gas or in aqueous solution, produces no change of colour.

If ten minims of an aqueous solution of chloride of barium be added to a fluid ounce of the vinegar, and the precipitate, if any, be separated, a further addition of the reagent should give no further precipitate of sulphate of barium.

Therapeutics.—Internally vinegar is seldom given, but it is sometimes administered with the object of allaying heat. It is styptic, astringent, and diuretic. It is sometimes also employed as a lithontriptic for calculi and urinary deposits which consist of phosphates or carbonates of calcium or magnesium. It is also antidotic to the alkalies and their carbonates, in cases of poisoning by them. Externally, vinegar diluted with water is useful as a local application for bruises and sprains, and may also be employed for sponging the skin, where the internal temperature is very high.

Posology :—

Horses and cattle	... 1 to 2 fluid ounces.
Sheep and pigs	... 1 to 2 fluid drachms.
Dogs ...	... 15 to 25 minims.

ACETUM CANTHARIDUM.

Vinegar of Cantharides.

Synonym.—Acetum Cantharidis.

Natural Order.—The Spanish Fly, Cantharis vesicatoria, is a member of the Coleoptera.

Chemical Composition.—Vinegar of cantharides is an impure solution of cantharidin—$C_5H_6O_2$, in acetic acid.

Mode of Preparation.—Take of

Bruised Cantharides, 2 ounces ;
Glacial Acetic Acid, 2 fluid ounces ;
Acetic Acid, 20 fluid ounces.

Mix 13 fluid ounces of acetic acid with the glacial acetic acid, and digest 2 ounces of cantharides in this mixture for two hours at a temperature of 93·3° C. ; then transfer the ingredients, after they have cooled, to a percolator, and, when the liquid ceases to pass, pour 5 fluid ounces of acetic acid over the residuum in the apparatus. As soon as the percolation is complete, subject the contents of the percolator to pressure. Filter the product, mix the liquids, and add sufficient acetic acid to make 1 pint.

Character.—The specific gravity is about 1·060.

Therapeutics.—Acetum cantharidum is a prompt counter-irritant, and may be used in those cases, where a less active vesicant than the ointment is indicated. The strength of this preparation, which is one of great value, is one in ten. It is useful for splints in horses which cannot be rested. When mixed with an equal portion of Linimentum Terebinthinæ Aceticum, the mixture is useful as a strong liniment for sore throats, and as a counter-irritant in cases of pleurisy and inflammation of the lungs in the dog.

ACETUM SCILLÆ.

Vinegar of Squill.

Natural Order.—The Urginea Scilla, from the Mediterranean coasts, belongs to the Liliaceæ.

Mode of Preparation.—Take of

Squill,* bruised, 1 part;
Diluted Acetic Acid, 8 fluid parts.

Macerate the squill in the acetic acid for seven days; then strain with expression, and filter.

Character.—The specific gravity is about 1·038.

Preparation.—Oxymel Scillæ.

Therapeutics.—Squill acts as a stimulating expectorant. It is sometimes given to the dog, with the object of aiding the expectoration of mucus. For this purpose, it may be combined with wine of ipecacuanha. This preparation proves valuable in cases of bronchitis, after the acute stage is past.

Posology.—For the dog, 10 to 40 minims.

ACIDA.

Acids.

General Characters.—Most acids have a sour taste,† and redden blue litmus.‡ They combine with alkalies, and so form compounds, which do not turn red litmus-paper blue. They may be looked upon as compounds of hydrogen with certain different radicals. Hydrogen is an element which is readily displaced by other bases.

* Squill is obtained by slicing the bulb and drying the slices.

† Boric and carbolic acids do not give rise to a sour taste.

‡ Carbolic acid does not redden blue litmus. It is really an alcohol, though in chemical combinations it acts like an acid.

Mode of Preparation.—Acids are very generally prepared by liberating them from their alkaline salts by means of sulphuric acid. If volatile, they are separated by distillation; if non-volatile, by crystallization. Hydrocyanic acid is obtained from ferrocyanide of potassium, not from the cyanide. Citric and tartaric acids are prepared from the citrate and the tartrate of calcium respectively. When sulphuric acid is added to them, sulphate of calcium is formed, and is removed from the acids by decantation or filtration. In order to prepare citrate of calcium, chalk is added to boiling lemon-juice, and the colouring matter is washed away from the precipitate, by hot water in preference to cold, because citrate of calcium is less soluble in hot than in cold water. The following are exceptions to the rule that acids are prepared from salts by means of the action of sulphuric acid upon them: Arsenious, Benzoic, Carbolic, Gallic, Hydrobromic, Oleic, Oxalic, Phosphoric, Sulphuric, Sulphurous, Salicylic, and Tannic Acids.

General Action of Acids.—The acids combine with electropositive or basic substances, when in contact with them. All the tissues of the body are alkaline. The acids primarily neutralize these alkalies; and, if albumen is dissolved in them, it will be precipitated; and then, if the acid is in sufficient quantity, it will redissolve the precipitated albumen, forming acid albumens. When added to blood, they precipitate albuminous substances, and decompose the hæmoglobin, forming a substance which holds oxygen with greater tenacity than hæmoglobin does. They coagulate myosin, and produce rigidity in muscles. Sulphuric and phosphoric acids take up water readily, and completely decompose the tissues, if applied to them. Nitric acid does not in great measure redissolve the albumen precipitated by it, and hence a cloak to its further action is produced, so that it does not penetrate so deeply as sulphuric acid. Round the

tissue killed by the acids inflammation ensues, and an *eschar* is produced. When the action is milder, inflammation of the surface of the dermis and *vesication* are produced. In still milder actions they precipitate albumen, act as *irritants*, and cause contraction of the bloodvessels. Sometimes merely a temporary congestion, subsequent to the contraction, is produced. Then they are said to act as *rubefacients.*

ACIDUM ACETICUM.

Acetic Acid.

Chemical Composition.—One hundred parts by weight contain 33 parts by weight of real acetic acid, $HC_2H_3O_2$.

Mode of Preparation.—It is an acid liquid obtained from wood by destructive distillation, and subsequently purified.

Characters.—Acetic acid is a colourless liquid which possesses a strongly acid reaction, and a pungent and very characteristic odour. Its specific gravity is 1·044. An amount weighing 182 grains requires for neutralisation 1,000 grain-measures of the volumetric solution of soda.

Tests:—

Positive.—It gives a cherry-red colour with perchloride of iron.

Negative.—When evaporated acetic acid leaves no residue.

It gives no precipitate with hydrogen sulphide, nor with barium chloride, nor with silver nitrate.

If acetic acid is mixed with water and hydrochloric acid and put into a small flask, and then a few pieces of granulated zinc are added, effervescence results owing to the evolution of hydrogen. The absence of hydrogen sulphide may be made evident by the fact that a slip of bibulous paper, moistened with a solution of subacetate of lead, does

not become discoloured, when held for about five minutes over the mouth of the flask. Should it, however, show a deposit of glistening sulphide of lead, the presence of impurities in some one of the materials present is proved thereby.

Preparations:—

Acidum Aceticum Dilutum, which contains 4·27 per cent. of real acetic acid.

Acetum, which contains 5·41 per cent. of real acetic acid.

Acidum Aceticum, which contains 33 per cent. of real acetic acid.

Acidum Aceticum Glaciale, which contains 98·8 per cent. of real acetic acid.

Acetum Cantharidum.

Acetum Scillæ.

Linimentum Terebinthinæ Aceticum.

Oxymel.

Oxymel Scillæ.

Acetates:—

Æther Aceticus.

Ammonii Acetatis Liquor.

Ammonii Acetatis Liquor Fortior.

Ferri Acetatis Liquor.

Ferri Acetatis Liquor Fortior.

Ferri Acetatis Tinctura.

Morphinæ Acetas.

Morphinæ Acetatis Liquor.

Plumbi Acetas.

Plumbi Subacetatis Liquor.

Plumbi Subacetatis Liquor Dilutus.

Potassii Acetas.

Zinci Acetas.

Therapeutics. — Stimulant, astringent, corrosive, and vesicant. It is not administered internally. Externally, strong acetic acid has been employed as a corrosive.

ACIDUM ACETICUM DILUTUM.

Diluted Acetic Acid.

Mode of Preparation.—Mix 1 fluid part of acetic acid with 7 fluid parts of distilled water.

Characters.—The specific gravity is 1·006.

One fluid ounce requires for neutralization 313 grain-measures of the volumetric solution of soda. It contains 4·27 per cent. of real acetic acid, $HC_2H_3O_2$. One fluid ounce therefore contains nearly 19 grains of real acetic acid.

Preparations :—

Acetum Scillæ.
Liquor Morphinæ Acetatis.

Therapeutics.—Diluted acetic acid is used for the same purposes as vinegar.

Posology.—The doses are similar to those of acetum.

ACIDUM ACETICUM GLACIALE.

Glacial Acetic Acid.

Chemical Composition.—Glacial acetic acid is simply a concentrated form of ordinary acetic acid. It contains 98·8 per cent. of real acid, $HC_2H_3O_2$.

Mode of Preparation.—Distil acetate of sodium, from which the water has been expelled by heat, with sulphuric acid, by which means sulphate of sodium is formed, and acid distils over. If the product shows any sulphurous acid, when tried by the subacetate of lead and hydrochloric acid test, it should be shaken with dioxide of manganese, and redistilled. Any sulphurous acid which may be present

is thus converted into sulphuric acid, and remains as sulphate of manganese in the retort.

Characters.—Being very nearly three times as strong as acetic acid, it possesses an especially pungent and very characteristic odour.

When cooled to about 1·1° C. it crystallizes, and remains crystalline until the temperature is raised to 15·5° C. Below the ordinary temperature of the air, then, it is a crystalline solid, while above it, it is a colourless liquid.

The specific gravity varies, that of the solid form being about 1·0655; while when liquefied, and at a temperature near 15° C., it has a specific gravity of about 1·057.* Its properties are similar to those of acetic acid.

Tests:—

Quantitative.—A quantity weighing 60 grains, if mixed with a fluid ounce of distilled water, requires for neutralisation 990 grain-measures of the volumetric solution of soda.

Negative.—To prove the absence of sulphurous acid, see Acetic Acid.

Preparations:—

Acetum Cantharidum.
Linimentum Terebinthinæ Aceticum.

Therapeutics.—Glacial acetic acid is rubefacient, vesicant and caustic. It is not administered internally.

ACIDUM ARSENIOSUM.

Arsenious Acid.

Synonyms.—White Arsenic; Anhydrous Arsenious Acid; Arsenious Anhydride; Arsenic Trioxide; Arsenious Oxide. *Vide* Oxidum Arseniosum.

* The specific gravity is increased by adding 10 per cent. of water.

ACIDUM BENZOICUM.

Benzoic Acid.

Chemical Composition.—$HC_7H_5O_2$. Not chemically pure.

Mode of Preparation.—Benzoic acid is obtained by heating benzoin, when benzoic acid sublimes.

Characters.—It occurs in the form of crystalline plates and needles which are feathery, flexible, and nearly colourless, and possess an agreeable aromatic odour, similar to that of benzoin. Benzoic acid melts at 120° C., and boils at 238·9°, when it passes off as vapour, leaving only a slight residue.

Solubility.—It is sparingly soluble in water, but readily in rectified spirit. When it is dissolved in solutions of the alkalies and of lime, benzoates are formed, which may be decomposed by the addition of hydrochloric acid with the precipitation of benzoic acid.

Preparations :—

Tinctura Camphoræ Composita, containing 2 grains in 1 fluid ounce.

Ammonii Benzoas.

Sodii Benzoas.

Therapeutics.—Benzoic acid and the benzoates have not as yet been much employed in veterinary practice. Benzoic acid is a stimulant, and irritant when applied to raw surfaces. Being destructive to low forms of vegetable life, it acts well as an antiseptic. It is also diuretic, and gives rise to the excretion by the kidneys of hippuric acid. It acts on the bronchial mucous membrane as a stimulating expectorant, diminishing the secretion from the inflamed surface. Combined with other remedies, it has been found of value in treating cough in dogs. Acting also on the mucous membrane of the bladder, it is useful in treating

cases of chronic inflammation of that organ. As an antipyretic, benzoic acid is not nearly so efficacious as salicylic acid. It has, nevertheless, been sometimes given in acute rheumatism alternately with salicylates.

Benzoate of ammonium acts as a diuretic and slight stimulant.

Benzoate of sodium has a powerful stimulant action on the liver of the dog, and may be administered with advantage in rheumatic arthritis in sheep.

Posology:—

Benzoic Acid. Horses and cattle, 4 drachms or more.
„ „ Dogs, 1 to 10 grains.
Benzoate of Sodium or Ammonium. Sheep, 4 drachms.
„ „ „ Dogs, $\frac{1}{2}$ to 1 drachm.

ACIDUM BORICUM.

Boric Acid.

Synonym.—Boracic Acid.

Chemical Composition.—Boric acid is a tribasic acid, of which the formula is H_3BO_3.

Mode of Preparation.—It is obtained by acting upon sodium biborate (borax) with sulphuric acid, and also by the purification of native boric acid.

Characters.—Boric acid is a weak acid, existing in the form of transparent, colourless, odourless, pearly, six-sided crystalline plates, or as irregular masses of crystals. It is easily powdered, and unctuous to the touch. The taste is feebly sour and bitterish, and leaves a sweetish after-flavour in the mouth.

Solubility.—Boric acid is soluble in 3 parts of boiling water, in 5 of glycerine, in 16 of rectified spirit, at 15·5° C., and in 25 of water at the ordinary temperature.

Tests :—

Positive.—Blue litmus paper, or solution, becomes red, when acted upon by boric acid.

Turmeric paper, moistened with an aqueous solution, turns brown, and this colour remains unaltered in the presence of free hydrochloric acid. When a piece of turmeric paper is placed in a solution slightly acidified in this way, and gently dried, it becomes brownish-red; and if solution of caustic potash is added, the brown colour is replaced by green.

If alcohol is added to an aqueous solution of boric acid, or a borate, and a light applied, the flame presents a greenish hue.

The crystals liquefy when warmed, and on careful ignition lose 43·5 per cent. of their weight. The product solidifies when cooled, forming a brittle glass-like mass.

Negative.—An aqueous solution of boric acid ought not to yield more than mere traces of white precipitates when treated with chloride of barium, nitrate of silver, or with oxalate of ammonium. Otherwise the presence of sulphuric acid, chlorides, calcium, etc., may be indicated.

It should give no precipitate with sulphide of ammonium, nor impart a strong persistent yellow tinge to a colourless flame, such as that of spirit, or of a mixture of air and gas, as in the Bunsen burner, by which colouration the presence of sodium would be indicated.

Preparations :—

Unguentum Acidi Borici.
Lotio Acidi Borici.
Boroglyceride.

Therapeutics :—

Externally.—Boric acid has the property of destroying low organisms, and being cheap, non-volatile, and not irritating, has of late been much used in veterinary practice.

The lotion and the ointment act very efficiently as antiseptic applications for surface-wounds, sores, and saddle-galls, in which cases they rapidly promote the healing process. Being non-irritating, boric acid does not interfere with the healing of wounds by first intention, and for fresh wounds it is therefore to be preferred to the preparations of carbolic acid, which are somewhat irritating and more powerful. For burns the ointment proves a valuable application, owing to its bland and soothing character. The ointment is also very useful for eczema in dogs, and for cracked heels in horses, and wonderfully good for sore shins in race-horses. For foul surfaces it is customary with us in the first instance to use an ointment of iodoform, oil of eucalyptus, carbolic acid and lard, and then after a few applications to employ the preparations of boric acid in its stead. In inflammation of the conjunctiva, a lotion of 3 grains of boric acid to the ounce of water may be used with advantage.

As boric acid is non-volatile, its application does not require to be so often renewed as in the case of the volatile antiseptics.

Internally.—Boric acid has been found by us to be very useful in scarlet fever in horses, and in distemper in dogs.

Posology :—

Horses ...	...	... 1 drachm.
Dogs ...	...	... 5 to 10 grains.

ACIDUM CARBOLICUM.

Carbolic Acid.

Synonyms.—Phenic Acid ; Phenol ; Phenic Alcohol.

Chemical Composition.—The formula is HC_6H_5O.

Mode of Preparation.—Carbolic acid is obtained from coal-tar oil by fractional distillation, and is subsequently purified.

Those portions of coal-tar oil which distil at temperatures between 148·5° C., and 204° C., are mixed with a strong boiling solution of hydrate of potassium. By this means carbolate of potassium is formed, and this is then decomposed by hydrochloric acid. The carbolic acid which is liberated is rectified by distillation off chloride of calcium, which deprives the acid of moisture.

Characters.—Carbolic acid is colourless, or slightly reddish or brownish, and exists in the form of separate pulverulent crystals, possessing a characteristic odour and taste, or in that of acicular crystalline masses.

In odour and taste carbolic acid resembles creasote, as it does also in other respects. It melts at 33° C., and boils at 188·3° C. Specific gravity at melting-point is about 1·063.

Solubility.—At 15·5° C., 100 parts of the acid can be liquefied by the addition of about 7½ parts of water; while they are dissolved by about 1,500 parts of water. The crystals readily absorb moisture on exposure to the air, thus being liquefied. The aqueous solution ought to be nearly colourless.

The acid is also freely soluble in alcohol, ether, benzol, chloroform, carbon disulphide, glycerine (with or without the addition of water), and in solutions of alkalies.

Tests:—

Positive.—A very small quantity (about a grain) of hypochlorite of calcium, added to a little aqueous solution of carbolic acid, produces after agitation, the addition of a little ammonia, and gentle heat, a bright blue colour with a tinge of green.

Carbolic acid coagulates albumen.

With solutions of perchloride of iron, or of ammonia, or of chlorinated soda, it yields a deep purple colour.

With an aqueous solution of bromine, a cold saturated aqueous solution of carbolic acid gives a white precipitate.

A small piece of deal dipped into carbolic acid, and afterwards into hydrochloric acid, and then dried by exposure to the air, acquires a greenish-blue colour.

Negative.—It does not affect the plane of polarization of a ray of polarized light.

Preparations:—

Acidum Carbolicum Liquefactum.
Glycerinum Acidi Carbolici.
Unguentum Acidi Carbolici.
Lotio Acidi Carbolici.
Sodii Sulphocarbolas.
Zinci Sulphocarbolas.

ACIDUM CARBOLICUM LIQUEFACTUM.

Liquefied Carbolic Acid.

Synonym.—Liquor Acidi Carbolici.

Mode of Preparation.—To Carbolic Acid 10 per cent. of water is added.

Characters.—It is a colourless or very slightly reddish or brownish liquid, which boils at about 188·3° C.

It dissolves about 22 per cent. of water at 15·5° C., forming a nearly clear solution, from which any slight impurity, contained previously in the acid, separates in the form of dark oily drops. The specific gravity is about 1·065 at 15·5° C.

Therapeutics:—

Action.—Carbolic acid is a powerful antiseptic, deodorizer, and disinfectant. It precipitates albumen, and destroys low organisms. By its presence the fermentation of sugar by yeast and the decomposition of albuminous liquids are prevented. Lesser quantities than those which destroy these low forms of vegetable life are effectual in preventing

their development. When applied to the skin and mucous surfaces, carbolic acid coagulates albumen, leaving a white dry surface, and greatly diminishing the sensibility of the part. The stain afterwards becomes brownish, and the epidermis after a time peels off. When taken internally in poisonous doses, carbolic acid acts as an irritant narcotic poison. The symptoms caused by its ingestion in man and the dog are those of gastro-enteritis, usually accompanied with abdominal pain. Vomiting and purging sometimes follow its administration; and collapse, delirium and convulsions usually precede death. When absorbed, carbolic acid acts on the medulla oblongata and spinal cord, first stimulating and then paralysing these centres. In the same manner it acts on the respiratory and vaso-motor centres. It stimulates the salivary and perspiratory centres, thus causing salivation and increased flow of sweat. It is excreted by the kidneys. It has been experimentally shown that 1 ounce doses have only slight and transient effects on horses. Dogs, however, are very susceptible to the action of carbolic acid, when it is absorbed through the skin or taken internally. Strong applications of carbolic acid have a very deleterious action on the dog, and may even lead to a fatal result.

Uses:—

Internally.—Carbolic acid has perhaps been more extensively employed as an internal remedy in veterinary than in human medicine.

In the horse it has been given with good results in the treatment of anthrax fever, malignant strangles, and purpura hæmorrhagica. In pyæmic and septicæmic conditions it has also proved of some benefit. In the treatment of glanders and farcy, carbolic acid has no permanent value.

In cattle, carbolic acid has been administered in cattle plague with encouraging results, life being lengthened even

when not saved. One hundred and five grains were injected by Mr. Crookes into the blood of a cow, suffering from cattle plague, with little apparent injury, and the animal made a gradual recovery. M. Bouley, in investigating malignant pustule, found that all the cattle inoculated with the virus of this disease died. When, however, animals were given two or three drachms of carbolic acid daily, four out of five of them recovered. In Texas fever, which is due to the same virus, carbolic acid likewise has been found of great value. Personally, the writers have had more experience with sulphite of sodium in the treatment of anthrax in its various forms in horses, cattle, pigs, and sheep. In the treatment of these diseases, it is difficult to say which of these two antiseptics is of greater value.

In pleuro-pneumonia of cattle, carbolic acid appears to be of little or no value. In foot and mouth disease it appears to act beneficially, as also in tabes mesenterica.

For dyspepsia and flatulence the sulpho-carbolate of sodium is to be preferred to the pure carbolic acid. In diarrhœa and dysentery, carbolic acid acts as a valuable adjuvant, when used together with other remedies. In dogs, carbolic acid is not much given, as it is not borne well by these animals.

As an inhalation, 2 drachms of carbolic acid added to a quart of water at about 70° C., prove very useful in cases of influenza, strangles, scarlet fever, purpura hæmorrhagica, œdematous laryngitis, and acute and chronic bronchitis. It is especially valuable in treating acute laryngitis.

As an intra-tracheal injection, carbolic acid has been employed in the case of calves suffering from the presence of strongyli micruri in the wind-pipe and bronchial tubes. For this purpose a mixture of 2 drachms of oil of turpentine, 20 minims of carbolic acid, and 1 drachm of tincture of opium is recommended by Mr. Parsons. Mr.

Penhale recommends half a drachm of chloroform instead of the opium.

Externally.—For external purposes, carbolic acid is more largely used than any other antiseptic. In the antiseptic method of the treatment of animals originated by Sir Joseph Lister, carbolic acid is extensively employed. Where it is desired to perform an operation under this method, a 5 per cent. (1 in 20) solution in water is used as a spray, and for cleansing the instruments. A $2\frac{1}{2}$ per cent. solution in water is used as a lotion, to purify the sponges, and cleanse the hands of the operators. A strip of lint soaked with a solution of carbolic acid in olive oil (1 in 10), or a drainage tube previously thus anointed, is introduced into the wound and left protruding from it, for two or three days. Over this is placed oiled silk dipped in aqueous solution of carbolic acid (1 in 40). Carbolized tow or antiseptic gauze is placed next, then the mackintosh, then gauze again. Finally, carbolised bandages are applied, being carefully wound round.

Carbolic acid proves very valuable in healing abscesses, burns, wounds, broken knees, foul sores, and discharging surfaces. The strength of a lotion for general purposes should be that of about 1 in 40 of water. For ulcers and foul surfaces, a proportion of 1 in 20 or 25 of water will not be too strong.

As an injection into the uterine cavity and vagina in cases of metritis, and retention of decomposing placental membranes, 1 part to 60 of water furnishes a very serviceable proportion. In cases of leucorrhœa, a lotion of the same strength proves a useful injection.

In the preparation of lambing oil, no agent acts so well as a solution of pure carbolic acid. The following formula of the late Mr. D. Gresswell will be found to answer this purpose well:

℞ Acidi Carbolici, ʒii.
Glycerini, ʒii.
Olei Lavandulæ, ♏xx.
Mix and add water to one pint.

In the treatment of ringworm, 20 to 40 minims of carbolic acid to the ounce of lard or other ointment is useful for the purpose of destroying the vegetable fungus of this disease. Some practitioners make a 10 per cent. solution in diluted acetic acid for this purpose. In treating actinomycosis, carbolic acid with iodine has proved very useful when injected into the tumour in the tongue of the beast suffering from this disease. The best method of employing the mixture is that of incising the growth, and then painting the cut edges with this powerful parasiticide. Iodised phenol (1 part of iodine to 4 of carbolic acid) may be used; but an equally useful though less strong application, for the purpose of painting the edges of the incised tumours, may be made of 1 part of iodine, 4 of carbolic acid, and 4 of glycerine, or, if preferred, the stronger application may be employed.

As a caustic, carbolic acid is applied to bites by rabid animals. For stings of bees, wasps, and scorpions, a solution of carbolic acid acts very beneficially in causing subsidence of the swelling and irritation set up.

Carbolic acid is now largely used in the preparation of sheep dips, for destroying ticks and the acari of scab. MacDougall's sheep dip owes its value to the presence of this agent. For mange in horses, preparations of carbolic acid are also used; but we prefer for this purpose merely to add a small quantity of the acid to ointments containing stavesacre and sulphur, rather than to use strong solutions of this parasiticide. For dogs we do not often use carbolic acid in treating mange, as we prefer equally efficacious and

at the same time less risky applications of sulphur and staves acre, or green iodide of mercury. If carbolic acid is used in treating mange, one may employ a solution of 1 part of carbolic acid in 30 of oil.

The powder is perhaps the most convenient form in which carbolic acid may be used. Calvert's or MacDougall's, those with which we are most familiar, are sprinkled daily in the stables in many large establishments of omnibus proprietors. The solution of carbolic acid is especially useful for washing the harness, fittings, and other implements of horses which have died of anthrax and other grave contagious disorders. For whitewashing the walls as a disinfectant, carbolic acid is very valuable, and it may be employed as a powder, solution, or vapour. It must be remembered that the crude carbolic acid should be employed with more caution than is generally observed. When used freely in town stables, where the ventilation is bad, it frequently causes very depressing effects, and when used in excess, a low form of fever is not uncommon among the horses, as the result of this. It is our custom to rely more on weak chloride of lime solution or other efficacious disinfectants, and when we do employ carbolic acid, not to use the crude variety. The symptoms we have observed in horses as the result of the abuse of impure carbolic acid as a disinfectant in town stables, are extremely weak and thready pulse, chocolate coloured urine, and blood extravasations in the mucous membranes.

The addition of a pint of crude carbolic acid to a bucketful of lime-wash furnishes a good method of diffusing the disinfectant and cleansing the stable thoroughly. A pint or two of the acid to a gallon of water may be used for washing over the wood-work during the prevalence of any infectious or contagious disorder.

Posology:—

Horses ...	... 10 to 30 minims.
Cattle ...	... 10 to 40 minims.
Sheep and pigs	... 5 to 10 minims.
Dogs ...	... 1 minim.

ACIDUM CHROMICUM.

Chromic Acid.

Synonyms.—Anhydrous Chromic Acid; Chromic Anhydride; Chromic Sesquioxide; Chromic Oxide. *Vide* Oxidum Chromicum.

ACIDUM CITRICUM.

Citric Acid.

Chemical Composition.—An acid prepared from lemon-juice or from the juice of the fruit of Citrus Bergamia, the lime. The formula is $H_3C_6H_5O_7,H_2O$.

Mode of Preparation.—Take of

Lemon Juice, 4 pints;
Prepared Chalk, 4½ ounces;
Sulphuric Acid, 2½ fluid ounces;
Distilled Water, a sufficient quantity.

Heat the lemon-juice to its boiling-point, and add the chalk gradually until no more effervescence results. Collect the deposit on a calico filter, and wash it with hot water until the filtrate is free from colour. Mix the precipitate with a pint of distilled water, and then add gradually the sulphuric acid, previously diluted with a pint and a half of distilled water. Boil gently for half an hour while constantly stirring the mixture. Filter again to separate the acid solution, wash the insoluble matter with distilled water, and add the washings to the filtrate. Concentrate this solution to the

density of 1·21, then allow it to cool; and, after about twenty-four hours, decant the liquor from the crystals of calcic sulphate which will have formed. Further concentrate the liquor until a film forms on its surface, and set it aside to cool and crystallise. Purify by recrystallisation.

Characters.—Citric acid occurs in colourless crystals, of which the right rhombic prism is the primary form.

Solubility.—Citric acid is very soluble in water ($\frac{3}{4}$ of their weight of cold, and $\frac{1}{2}$ their weight of boiling water), less soluble in rectified spirit, and insoluble in pure ether. The diluted aqueous solution has a pleasant acid taste. A solution made of about 40 grains to the fluid ounce of water resembles lemon-juice in strength, and in that it undergoes decomposition, and becomes mouldy by keeping.

Tests :—

Negative.—The aqueous solution is not darkened by hydrogen sulphide, gives no precipitate with barium chloride, and none when added in excess to solution of acetate of potassium.

The aqueous solution gives no turbidity when sparingly added to cold lime water.

Preparations :—

Citrates :—

Bismuthi Citras.
Bismuthi et Ammonii Citratis Liquor.
Ferri et Ammonii Citras.
Ferri et Quininæ Citras.

Therapeutics.—Citric acid is not much used internally in veterinary medicine. In the convalescent stage of influenza and other depressing fevers, citric acid, in doses of 1 drachm in the drinking water twice daily, has been found to be of great service, particularly in thoroughbreds.

Posology.—Horse, 1 drachm.

ACIDUM GALLICUM.

Gallic Acid.

Natural Order.—Galls are excrescences on Quercus Lusitanica, which belongs to the Cupuliferæ.

Chemical Composition. — An acid whose formula is $H_3C_7H_3O_5,H_2O$.

Mode of Preparation.—Boil 1 part of coarsely powdered galls with 4 fluid parts of diluted sulphuric acid for half an hour, strain through calico while hot, collect the crystals which are deposited on cooling, and purify these with animal charcoal and by means of repeated crystallisation.

Characters.—Gallic acid is generally of a pale fawn colour, but sometimes nearly white, and exists in the form of acicular prismatic crystals or silky needles. It loses 9·5 per cent. of its weight when dried at 100° C.

Solubility.—About 100 parts of cold water, but only 3 parts of boiling water, are required to dissolve 1 part of gallic acid. It is soluble in rectified spirit.

Tests :—

Negative.—(1) An aqueous solution of gallic acid gives no precipitate with an aqueous solution of isinglass.

(2) Gallic acid leaves no residue when burned with free access of air. An aqueous solution gives a bluish-black precipitate with a persalt of iron.

Therapeutics.—The therapeutic actions and doses of gallic acid are the same as those of tannic acid, and will therefore be spoken of in detail under the latter heading.

ACIDUM HYDROBROMICUM DILUTUM.

Diluted Hydrobromic Acid.

Chemical Composition.—Diluted hydrobromic acid is an aqueous solution of the gas hydrogen bromide, of which it contains 10 per cent. by weight.

Mode of Preparation.—Take of

Bromine, 1 fluid ounce ;
Distilled water, a sufficient quantity ;
Sulphide of Hydrogen, a sufficiency.

Place the bromine in a glass cylinder and add to it 15 ounces of the water. Pass a current of the gas, sulphide of hydrogen, into the aqueous solution of bromine, until its red colour has disappeared. Filter the fluid, and distil the filtrate. Reject the distillate until it is free from the odour of sulphuretted compounds, and then collect it until sulphuric acid begins to distil. Dilute the distilled acid with water until it has a specific gravity of 1·077 at th temperature of 15·5° C. Preserve in glass-stoppered bottles From the rejected distillate more hydrobromic acid may b obtained by re-distillation.

Characters.—Diluted hydrobromic acid is a colourless and odourless liquid with a sour taste.

Tests :—

Positive.—It possesses an acid reaction.

Evaporated to dryness it leaves little or no residue. When chlorine water is added, bromine is liberated, and then the fluid becomes yellow.

With solution of nitrate of silver it yields a white curdy precipitate, insoluble in nitric acid, and only slightly soluble in solution of ammonia.

Quantitative.—810 grains by weight require for neutralisation 1,000 grain-measures of the volumetric solution of soda.

Negative.—Diluted hydrobromic acid does not become discoloured on keeping.

It gives no precipitate with chloride of barium.

Therapeutics.—One drachm of diluted hydrobromic acid is equivalent to 8 grains of bromide of potassium. As yet it has been very little used in veterinary practice, and is not to be preferred in action to bromide of potassium.

Posology.—Dog, 1 to 2 fluid drachms.

ACIDUM HYDROCHLORICUM.

Hydrochloric Acid.

Synonyms.—Muriatic acid, chlorhydric acid, hydrogen chloride.

Chemical Composition.—The solution here called hydrochloric acid is in reality composed of the gas chloride of hydrogen ($HCl = 36{\cdot}37$, density $= 18{\cdot}185$), which forms about 32 per cent. by weight of the solution.

Mode of Preparation.—Hydrochloric acid is prepared by distilling a mixture of chloride of sodium, sulphuric acid, and water, and allowing the hydrochloric acid gas which is given off to pass into a receiver containing distilled water; sodium sulphate remains in the retort.

Take of

Chloride of sodium dried, 48 ounces;
Sulphuric acid, 44 fluid ounces;
Water, 36 fluid ounces;
Distilled water, 50 fluid ounces.

Pour the sulphuric acid (which must be pure) slowly into 32 fluid ounces of the water, being careful to avoid any sudden admixture. The temperature of the mixture will be raised. When the mixture of water and acid has cooled, add it to the chloride of sodium (which must be pure) previously introduced into a large flask capable of containing at least a gallon. The mixture should be poured through a bent tube-funnel. The gas, which is rapidly evolved, should be purified from any sulphuric acid or salt, which might be carried over, by passing it through a small quantity of water contained in a wash-bottle. This is effected by connecting the flask with a bent glass tube, which passes through a cork closing the mouth of the flask, and dips into the remaining 4 ounces of water contained in the three-necked

wash-bottle. The flask may be gently heated. The gas which is disengaged is conducted through the wash-bottle into a second bottle, which contains the distilled water, by means of a bent tube dipping about half an inch or so below the surface of the water. The evolution of gas should be allowed to continue, until the resulting solution of the true acid measures 66 fluid ounces, *i.e.*, until the liquid has a specific gravity of 1·16. The bottle which contains the distilled water should be kept cool throughout the process; and this may be effected by placing it in a large vessel containing cold water, which must be kept at a low temperature.

The reaction which occurs is represented by the equation:

$$NaCl + H_2SO_4 = HCl + NaHSO_4.$$

The readily soluble acid sulphate of sodium is left in the flask.

Characters.—This solution of chloride of hydrogen is a nearly colourless and very acid liquid, which, when exposed to the air, emits white vapours possessing a pungent odour, and a penetrating effect on delicate mucous membranes. Its specific gravity is 1·16.

Tests:—

Positive.—When evaporated to dryness it leaves no residue.

With nitrate of silver it produces a curdy white precipitate of chloride of silver, which is soluble in excess of ammonia, but insoluble in nitric acid.

Quantitative.—A quantity weighing 114·8 grains, added to ½ ounce of distilled water, requires for neutralisation 1,000 grain-measures of the volumetric solution of soda.

If a drop or two of diluted solution of sulphate of indigo be added to half a fluid ounce of the acid, the mixture should gain a permanent blue tint.

Negative.—When diluted with four times its volume of distilled water, it should give no precipitate with solution of chloride of barium, or with sulphide of hydrogen, and even if boiled should not tarnish or alter the colour of bright copper foil.

For test to prove the absence of sulphide of hydrogen, *vide* Acetic Acid.

Preparations :—

Acidum Hydrochloricum Dilutum.
Acidum Nitro-hydrochloricum Dilutum.
Ammonii Chloridum.
Calcii Chloridum.
Hydrargyri Perchloridum.
Hydrargyri Subchloridum.
Liquor Antimonii Chloridi.
Liquor Arsenici Hydrochloricus.
Liquor Ferri Perchloridi.
Liquor Ferri Perchloridi Fortior.
Liquor Hydrargyri Perchloridi.
Liquor Morphinæ Hydrochloratis.
Liquor Zinci Chloridi.
Morphinæ Hydrochloras.
Sodii Chloridum.
Tinctura Ferri Perchloridi.
Zinci Chloridum.

Therapeutics.—Strong hydrochloric acid is corrosive and irritant. The diluted acid only is employed internally.

Externally the strong hydrochloric acid is used as a corrosive for canker. It has also been employed as a caustic for the removal of warts ; but we do not recommend the use of acids for this purpose.

ACIDUM HYDROCHLORICUM DILUTUM.

Diluted Hydrochloric Acid.

Mode of Preparation.—Add to 8 fluid ounces of hydrochloric acid 16 fluid ounces of distilled water, and add more water until at a temperature of 15·5° C.; the mixture measures 26½ fluid ounces.

Characters.—The specific gravity of the diluted hydrochloric acid is 1·052, and it contains 10·58 per cent. of real acid.

Tests:—

Quantitative.—A quantity weighing 345 grains and measuring 6 fluid drachms, requires for neutralisation 1,000 grain-measures of the volumetric solution of soda.

Preparations:—

Liquor Morphinæ Hydrochloratis.
Liquor Strychninæ Hydrochloratis.

Therapeutics.—Hydrochloric acid has tonic, astringent and antiseptic properties, and is antidotic in poisoning by alkalies. When administered internally, it promotes digestion, and being eliminated by the kidneys, it increases the volume of urine, rendering its reaction less alkaline. The alkalinity of the blood also is lessened. In veterinary practice, the value of diluted hydrochloric acid as a medicinal agent is not as universally appreciated as it might be.

As a general tonic, after abatement of the acute stage of the contagious fevers, diluted hydrochloric acid acts as a valuable tonic. In such cases it may with great advantage be given in conjunction with nux vomica or the cinchona alkaloids.

In horses thriving badly from various causes, the acid often proves very useful as a tonic, especially when com-

bined with vegetable tonics. When the intestinal canal is the seat of worms, hydrochloric acid given internally promotes more healthy digestion; and given with other remedies, is of value in causing their dislodgment. In cases of chronic dyspepsia in horses, it may similarly be given in conjunction with nux vomica and spirit of chloroform with great advantage. Small doses of the diluted acid not only increase the flow of saliva, but also promote the flow of gastric juice, and in this way they aid the digestion. In young sucking animals suffering from diarrhœa, hydrochloric acid given in small doses often proves efficacious in preventing the acid fermentation, and in allaying the irritation of the bowels. Pepsin may be given in conjunction with the acid in such cases. Diluted hydrochloric acid should be given in a large quantity of water.

Posology :—

Horses	... ½ to 2 fluid drachms.
Cattle...	... 2 to 4 fluid drachms.
Sheep and pigs	... 10 to 20 minims.
Dog ...	... 2 to 10 minims.

ACIDUM HYDROCYANICUM DILUTUM.

Diluted Hydrocyanic Acid.

History.—Hydrocyanic acid was discovered by Scheele in 1782, but was possibly known to the Egyptian priests, who employed it for poisoning the initiated who had divulged the mysteries.

Chemical Composition.—Hydrocyanic acid is a solution of hydrocyanic acid in water in the proportion of 2 per cent. by weight of the solution. Scheele's acid may contain from 1 to 5 per cent. of the anhydrous acid. The strength varies. It is employed largely, in veterinary practice

especially, for poisoning dogs, being put up in 1 ounce bottles. A fresh bottle should be opened on each occasion.

Preparations.—Take of

Ferrocyanide of Potassium, 2¼ ounces;
Sulphuric Acid, 1 fluid ounce;
Distilled Water, a sufficient quantity.

Dissolve the ferrocyanide of potassium in 10 ounces of distilled water, and add the sulphuric acid, carefully diluted with 4 ounces of water, and cooled, to the solution of the salt. Now place the mixture into a suitable glass or earthenware vessel, to which are attached a condenser and a receiver arranged for distillation. Place 8 ounces of distilled water in the receiver, and arrange for keeping the condenser and receiver cold. Then heat the flask carefully, until by slow distillation the liquid in the receiver measures 17 fluid ounces. Add to this sufficient water to make the acid of the right strength. This is ensured by finding that 100 grains (or 110 minims) give a precipitate of cyanide of silver with excess of solution of nitrate of silver, which, when thoroughly washed and dried, weighs 10 grains. When prepared, this acid should be kept in well-corked bottles, which should be enclosed in paper to prevent the action of light. The necks should be surrounded with impervious tissue. When not in use, the bottles should be inverted, and kept in a dark place.

Characters.—Diluted hydrocyanic acid is a colourless liquid possessing a characteristic smell resembling that of bitter almonds, and producing, when inhaled in very small quantities, a peculiar irritation of the throat. It is highly dangerous to inhale the vapour. It is miscible in all proportions with water, alcohol, and ether. The anhydrous acid as well as its concentrated aqueous solution is easily inflammable, and burns with a beautiful violet flame. On

exposure to light it decomposes very readily. The tendency to decomposition is greatly diminished by the presence of traces of mineral acid or of formic acid, while concentrated mineral acids as well as boiling alkalies decompose it. The products of decomposition of the diluted acid are ammonia, formic acid and other bodies. On the other hand, hydrocyanic acid and water are formed, when the ammonium salt of formic acid is quickly heated. Pure hydrocyanic acid is one of the most powerful and rapid of known poisons. When a small quantity of the vapour of the pure substance is drawn into the lungs, instant death results; while small quantities of the vapour of the diluted acid produce headache, giddiness, nausea, dyspnœa, and palpitation. The specific gravity of the diluted acid is 0·997.

Tests.—Diluted hydrocyanic acid only slightly and transiently reddens blue litmus.

It leaves no residue when evaporated in a platinum dish.

When a little of a mixed solution of the sulphate and of the persulphate of iron together with a little caustic potash and hydrochloric acid are added, Prussian blue is produced.

With solution of nitrate of silver, it gives a whitish precipitate of cyanide of silver which completely dissolves in boiling strong nitric acid.

Quantitative.—A quantity weighing 270 grains to which solution of litmus is added, the mixture being with care kept faintly alkaline by the addition of solution of soda throughout the operation, requires 1,000 grain-measures of the volumetric solution of nitrate of silver to be added before a permanent precipitate begins to form. The diluted acid therefore contains 2 per cent. of the real acid, HCN.

Negative.—There should be no precipitate with chloride of barium.

Therapeutics :—

Action.—Hydrocyanic acid is alike fatal to animal and vegetable life. In toxic doses it paralyses the cerebro-spinal axis, acting especially on the medulla oblongata and its respiratory centre. Death may be caused in two ways by this potent poison.

A large dose proves fatal in the course of a few seconds. The animal falls as if struck by lightning, and the pupils are widely dilated. The heart and the nerve centres seem to have their functions arrested simultaneously.

A smaller but fatal dose causes death by paralysis of respiration. The breathing becomes slow and gasping, the heart's action and pulse almost imperceptible, and consciousness is lost. In many cases death is preceded by suffocative convulsions. The dyspnœa is due to two causes, viz., to the paralysis of the respiratory centre in the medulla oblongata, and also to the fact that prussic acid combines with the hæmoglobin of the red corpuscles, thus, probably, interfering with the giving-up of oxygen to the tissues.

The toxic effects of this acid are observed in all animals, by whatever way the poison enters the system.

When applied to the skin, diluted hydrocyanic acid causes numbness, directly depressing the ends of the sensory nerves. It therefore proves useful in relieving itching in urticaria, prurigo, and eczema. In order to allay pain and irritation in chronic skin affections in dogs, two to three drachms of the acid mixed with a pint of water may be used as a lotion.

Uses.—Although hydrocyanic acid has been largely employed in treating tetanus in horses, it is of little value in severe cases. In milder cases of the idiopathic variety, it

probably has a beneficial action in some instances; but it cannot be relied upon in the treatment of this disease. One drachm of the acid in about a quart of water, when used slowly as an enema two or three times a day, is given to lessen the muscular contractions. As an adjuvant, it is sometimes employed with opium, in cases of dry irritable cough of a functional character. In asthma also it proves beneficial in relieving the animal. In cases of painful indigestion or obstinate vomiting in dogs, the acid is sometimes prescribed with advantage along with other remedies, such as 2 minims of the acid with 10 grains of carbonate of sodium in 1 ounce of water every hour. Hydrocyanic acid may be given by the mouth in water, or in the form of a ball with solid constituents. It may also be administered hypodermically or in the form of an enema.

Externally.—The power of the acid in relieving itching, renders it useful in treating cases of urticaria, prurigo, and eczema. For this purpose, one drachm of diluted hydrocyanic acid in 4 fluid ounces of water will prove useful. As this agent is absorbed through the skin, care must be taken in employing it, especially where the skin is raw.

Posology :—

Horses and cattle ...	20 minims to 40 minims, or even 1 fluid drachm.
Sheep and pigs ...	5 to 20 minims.
Dogs	2 to 4 minims.

ACIDUM NITRICUM.

Nitric Acid.

Preparations.—Nitric acid is prepared by distillation from nitrate of potassium or nitrate of sodium with sulphuric acid and water.

Characters.—This acid contains 70 per cent. by weight of real nitric acid, HNO_3. It is a colourless liquid when pure, and has a specific gravity of 1·42. When exposed to the air it emits an acid and irritating vapour. If poured on copper, it gives rise to the formation of dense red fumes of nitrogen tetroxide (nitrogen dioxide being first formed, and this uniting with the oxygen of the air to produce the higher oxide). If the acid be mixed with an equal volume of water, and then added to the copper, the colourless gas nitrogen dioxide is produced. This, in coming into contact with the air, combines with it to form the orange-red fumes (nitrogen tetroxide). If the nitrogen dioxide is introduced into a solution of sulphate of iron, it imparts to it a dark purple or brown colour which is due either to solution of the gas in the sulphate, or more probably to a chemical combination between the two. The boiling-point of the acid is 121° C. If submitted to distillation, the product continues uniform throughout the process.

Tests.—It leaves no residue when evaporated to dryness.

When 1 volume of nitric acid is added to 6 volumes of distilled water, it gives no precipitate with solution of barium chloride or solution of nitrate of silver.

Preparations :—

Acidum Nitricum Dilutum.
Acidum Nitro-hydrochloricum Dilutum.
Argenti Nitras.
Liquor Hydrargyri Nitratis Acidus.
Potassi Nitras.
Sodii Nitras.
Unguentum Hydrargyri Nitratis.

Therapeutics.—Strong nitric acid is powerfully irritant and corrosive. The diluted nitric acid only is employed

internally. As a caustic, nitric acid is sometimes employed for removing warts and other growths. As an external application, 3 drops of the strong acid to the ounce of water acts as an antiseptic in unhealthy wounds and sores.

ACIDUM NITRICUM DILUTUM.

Diluted Nitric Acid.

Mode of Preparation.—Dilute 6 fluid ounces of nitric acid with a sufficient quantity of water (a little over 24 fluid ounces), so that the mixture may measure 31 fluid ounces at a temperature of 15·5° C.

Characters.—Nitric acid is colourless, has a specific gravity of 1·101, and contains about 17·44 per cent. of real nitric acid, HNO_3.

Therapeutics.—Diluted nitric acid has tonic, astringent, and alterative properties, and is used for pretty much the same purposes as diluted hydrochloric acid. As a general tonic after debilitating diseases, the latter, or the diluted nitro-hydrochloric acid, is generally preferred. In the treatment of dyspepsia, hydrochloric acid, being the acid of the gastric juice, is also preferable to nitric acid.

In cases of farcy the diluted nitric acid acts beneficially, owing to its alterative and tonic properties. For these reasons also it has been administered in some chronic skin diseases, which prove incurable by preparations of arsenic.

In cases of enlargement of the liver in beasts, diluted nitric acid is indicated. It is necessary to dilute the acid freely with water or other fluid before it is administered internally.

Posology :—

Horses and cattle	... 1 to 2 fluid drachms.
Sheep and pigs	... 15 to 20 minims.
Dogs ...	... 2 to 10 minims.

ACIDUM NITRO-HYDROCHLORICUM DILUTUM.

Diluted Nitro-hydrochloric Acid.

Chemical Composition.—Diluted nitro-hydrochloric acid contains chlorine gas and hydrochloric, nitric and nitrous acids, and other compounds dissolved in water.

Preparation.—Add 3 fluid ounces of nitric acid and 4 fluid ounces of hydrochloric acid to 25 fluid ounces of water, and keep the mixture in a glass-stoppered bottle for fourteen days, before it is used. The nitric and hydrochloric acids may be allowed to be together for twenty-four hours in an unstoppered bottle before adding the water, and then there will be no need to wait fourteen days before the preparation is used.

Characters.—Diluted nitro-hydrochloric acid is a colourless liquid with a specific gravity of 1·07.

Therapeutics.—Diluted nitro-hydrochloric acid has astringent, alterative, and tonic properties, and is given for similar purposes and in the same doses as the diluted hydrochloric and diluted nitric acid. It is well known that the diluted nitro-hydrochloric acid has an infinitely better effect in the treatment of fevers than either of the acids from which it is made. In the after stages of influenza it is simply invaluable. It is chiefly administered on account of its action on the skin and liver. Stronger undiluted nitro-hydrochloric acid, made by mixing and gently heating 1 part of strong nitric acid with 3 of strong hydrochloric acid, is only used as an escharotic. It has the power of dissolving gold.

ACIDUM OLEICUM.

Oleic Acid.

Chemical Composition.—Oleic acid is a fluid fatty acid whose formula is $HC_{18}H_{33}O_2$. As a rule it is not quite pure.

Preparation.—It is obtained by the saponification of

olein, or by the action of superheated steam on fats, with subsequent separation from solid fats by pressure.

Characters.—Oleic acid is a straw-coloured liquid, nearly odourless and tasteless. It possesses a very faint acid reaction. If exposed to the air it becomes brown, and more acid in reaction. Its average specific gravity is ·875.

Solubility.—It is insoluble in water, but readily soluble in alcohol, chloroform, and ether.

At about 5° C. it becomes semi-solid, and at about 14·4° C. it melts again.

Tests.—When warmed with carbonate of potassium it should be completely saponified, and an aqueous solution of this salt, neutralised by acetic acid and treated with acetate of lead, should yield a precipitate which, after washing with boiling water, is almost entirely soluble in ether.

Preparations :—

Oleatum Hydrargyri.
Oleatum Zinci.
Unguentum Zinci Oleati.

Therapeutics.—See *Oleata.*

ACIDUM PHOSPHORICUM CONCENTRATUM.

Concentrated Phosphoric Acid.

Chemical Composition.—Concentrated phosphoric acid is true phosphoric acid, H_3PO_4, with 33·7 per cent. of water.

Preparation.—Place 6 fluid ounces of nitric acid, diluted with 8 fluid ounces of distilled water, into a glass flask, the mouth of which may be connected with a vertical glass condenser. Add 413 grains of phosphorus, connect the condenser, and boil the contents of the glass flask at such a rate that all condensed products shall return to the flask. Continue boiling until the phosphorus has entirely disappeared. Remove the condenser and concentrate the fluid, either in the flask or in a porcelain dish of hard well-

enamelled ware, until it is reduced to 4 fluid ounces. Transfer to a platinum vessel, and evaporate until about 2 fluid ounces remain, and orange-coloured vapours are no longer produced. Mix the resulting 2 fluid ounces with distilled water until, when cold, it measures 3 fluid ounces and has a specific gravity of 1·5.

Characters.—Concentrated phosphoric acid is a colourless syrupy liquid, possessing a sour taste and a strongly acid reaction.

With ammonio-nitrate of silver, diluted phosphoric acid gives a canary-yellow precipitate soluble in ammonia and in diluted nitric acid.

When evaporated it leaves a residue which melts at a low red heat, and upon cooling exhibits a glassy appearance.

Negative.—It is not precipitated by sulphide of hydrogen (showing the absence of metals), nor by chloride of barium (showing the absence of sulphuric acid), nor by nitrate of silver acidulated with nitric acid (showing the absence of hydrochloric acid), nor by solution of albumen (showing the absence of metaphosphoric acid, which coagulates albumen). When mixed with sulphuric acid and then added to a solution of sulphate of iron, it does not communicate to it a dark colour, thus indicating the absence of nitric acid. When mixed with an equal volume of solution of perchloride of mercury and heated, no precipitate of pyrophosphates is produced.

Preparations :—

Acidum Phosphoricum Dilutum.
Calcii Phosphas.
Ferri Phosphas.
Sodii Phosphas.
Syrupus Ferri Phosphatis.

Therapeutics.—The diluted phosphoric acid is preferable for internal use.

ACIDUM PHOSPHORICUM DILUTUM.

Diluted Phosphoric Acid.

Chemical Composition.—Diluted phosphoric acid is a solution of concentrated phosphoric acid in water in the proportion of 3 parts of the acid to about 17 parts of water. This corresponds to a 10 per cent. solution of phosphoric anhydride (P_2O_5) by weight.

Characters.—It is a colourless liquid, possessing a sour taste and a strongly acid reaction. The specific gravity is 1·08. For other characters and for tests, *vide* the concentrated form.

Uses.—Phosphoric acid may be used to allay thirst, like other diluted acids, in febrile states and in diabetes.

Therapeutics.—Diluted phosphoric acid is not much used in veterinary practice. It has, however, proved useful when combined with phosphate of lime and cod-liver oil in treating rickets in puppies. As it has the property of dissolving phosphate of lime, it may be administered to animals with calculi composed of this substance. It may also be profitably used in scrofulous diseases, and in diabetes; to diminish the growth of bony tumours, and in man to prevent alkalinity of the urine.

Compared with the other diluted acids, phosphoric acid has not such marked astringent properties.

Posology.—Dogs, 5 to 30 minims.

ACIDUM SALICYLICUM.

Salicylic Acid.

Chemical Composition.—The formula of salicylic acid is $HC_7H_5O_3$. It is a crystalline acid obtained by the combination of the elements of carbolic acid, HC_6H_5O, with those of carbonic acid gas, CO_2, being subsequently purified.

Salicylic acid may also be prepared from the oils of wintergreen (Gaultheria procumbens) and sweet birch (Betula lenta).

Characters.—This most important acid exists in white acicular crystals, which are inodorous. They are, however, light, and therefore easily conveyed to the nostrils, thereby irritating them. The taste is at first sweet and then acid.

Solubility.—Salicylic acid is soluble in the proportion of 1 part to 500 or 700 of water at the ordinary temperature, readily soluble in alcohol, ether, and hot water. It is also soluble in solutions of citrate or acetate of ammonium, phosphate of sodium, or borax.

At about 155° C. salicylic acid melts, and below 200° C. it volatilises without decomposition.

Tests.—An aqueous solution gives, with solution of perchloride of iron, a reddish-violet colour (*vide* Acetic Acid and Carbolic Acid).

An alcoholic solution allowed to evaporate spontaneously should leave a perfectly white residue.

Preparations :—

Unguentum Acidi Salicylici.
Sodii Salicylas.

Therapeutics :—

Action.—Salicylic acid is a powerful antiseptic, and, according to Wagner, it is a more efficient disinfectant of wounds than carbolic acid. When added in the proportion of 1 to 10 per cent. to fluids containing the germs of bacteria, it will prevent their development, and in the proportion of 1 in 60 will destroy bacteria when swarming in a fluid (Brunton). In preventing fermentation, it is said to be three times more effectual than carbolic acid. It prevents alcoholic fermentation, and destroys the life of the yeast-plant. It is much used for surgical dressings, having, like

boric acid, the advantage over carbolic acid in that it is less irritating. It is not volatile, and therefore does not affect the surrounding atmosphere. In fever salicylic acid is a very efficient agent for reducing the temperature. In health it has but little efficacy in lowering the normal heat of the body. On account of this property of reducing temperature it has been much used in the treatment of acute rheumatism, but for this and other internal purposes it is better to use the salicylate of sodium. Salicylic acid is excreted by the kidneys, skin, and salivary glands, and is eliminated in the urine as salts of salicylic acid and partly as salicyluric acid. In toxic doses it causes feebleness of the circulation, lowers the blood-pressure, and proves fatal through paralysis of respiration.

Uses.—Externally salicylic acid is much used instead of carbolic acid. It acts as a valuable antiseptic in preventing fœtor of gangrenous and offensive smelling sores, and in all descriptions of wounds it arrests suppuration, putrefaction, and fœtor. At the same time it abates the pain and hastens the healing process. The writer has also used it as an injection into open joints, in which, from its antiseptic and at the same time non-irritating properties, it acts well.

Salicylic acid is useful in the form of a gargle in cases of foot-and-mouth disease. A solution of the strength of 1 drachm to the fluid ounce of water is very suitable for this purpose, and also as a lotion to be applied to the feet. This acid may also be employed with good effect in the form of an ointment, consisting of equal parts of the acid and lard as an external application to open joints.

Internally salicylic acid has proved very valuable in cases of acute and subacute rheumatism, but in this disease we ourselves prefer the salicylate of sodium.

A writer in a continental journal recommends salicylic acid as an infallible means of curing or preventing the

diarrhœa of sucking calves. It was given in small doses to the calf itself, or in larger doses to the mother. He found that the calves of cows to which the medicine was given two days in succession, immediately after calving, remained absolutely free from diarrhœa, while all the others in the sheds were more or less affected.

In the treatment of malignant fevers, such as strangles, malignant influenza, purpura, and scarlet fever, salicylic acid is a useful remedy in reducing the high temperature; but for almost all internal purposes it is preferable to employ the salicylate of sodium, as being more easily and readily absorbed in the system.

Posology:—

Horses and cattle	... 1 to 3 drachms.
Sucking calves and pigs	... 2 scruples.
Sheep and dogs ...	... 10 to 15 grains.

ACIDUM SULPHURICUM.

Sulphuric Acid.

Chemical Composition.—This acid contains about 98 per cent. by weight of real sulphuric acid (H_2SO_4), which consists of the equivalent of water added to the anhydride, sulphur trioxide (SO_3).

Mode of Preparation.—Sulphuric acid is produced by the combustion and oxidation of sulphur, and by the oxidation and hydration of the resulting gas, sulphurous anhydride, SO_2, by means of nitrous and aqueous vapours.

Characters.—Sulphuric acid is an intensely acid and corrosive, inodorous and colourless liquid of oily consistence. Its specific gravity is 1·843. On the addition of water great heat is produced.

Tests :—

Positive.—It blackens and corrodes most organic substances. When added to sugar, for instance, it decomposes that substance, leaving a black residue.

When diluted with water and added to a solution of chloride of barium ($BaCl_2$), it gives a copious white precipitate of sulphate of barium ($BaSO_4$), insoluble in nitric acid and in hydrochloric acid.

Quantitative.—A quantity weighing 50 grains, mixed with a fluid ounce of distilled water, requires for neutralisation 1,000 grain-measures of the volumetric solution of soda.

Negative.—The following impurities are to be guarded against :—

Lead, derived from the leaden chambers in which it is prepared. It may contain so much lead in the form of sulphate, that when diluted with water it deposits a white precipitate, as the sulphate of lead is soluble in the strong but not in the weak acid.

Nitric acid, from the nitrous fumes by means of which it is produced. If a solution of sulphate of iron be carefully poured over its surface, there should be no purple or brown colour where the liquids meet.

Arsenic, which may have been derived from impure sulphur having been used. The arsenious fumes would pass off, together with the gas, sulphurous anhydride.

Water, which may be present either as a result of fraudulent addition, or from the concentration needed having been imperfectly carried out. The specific gravity should not be below 1·84.

When evaporated in a platinum dish, it should leave little or no residue, thus indicating the absence of lead, arsenic, or saline impurities; and when diluted with 6 times its volume of distilled water, it should give no precipitate with excess of sulphide of hydrogen, even when boiled, thus proving the absence of arsenic and lead.

Preparations :—

Acidum Sulphuricum Dilutum.
Alumen.
Alumen Exsiccatum.
Atropinæ Sulphas.
Cupri Sulphas.
Ferri Sulphas.
Ferri Sulphas Exsiccata.
Ferri Sulphas Granulata.
Hydrargyri Sulphas.
Liquor Ferri Persulphatis.
Magnesii Sulphas.
Potassii Sulphas.
Quininæ Sulphas.
Sodii Sulphas.
Zinci Sulphas.

Acidum Sulphuricum has a specific gravity of 1·843, and contains 98 per cent. by weight of real sulphuric acid, H_2SO_4.

Acidum Sulphuricum Dilutum has a specific gravity of 1·094, and contains 13·65 per cent. of real sulphuric acid.

Therapeutics.—Strong sulphuric acid is only employed externally. It is a powerful corrosive, and has been used for the removal of cancerous growths and warts. For this purpose it is mixed with sawdust so as to form a thin pulp. If used, the neighbouring tissues must be protected by a wall of gutta-percha. We, however, consider this bad and objectionable treatment, and, for such purposes, greatly prefer the hydrate of potassium and other preparations.

Strong sulphuric acid is sometimes added in small amount to blistering ointments, and is one of the constituents of the preparation known as 'black oil,' which is used for various purposes. 'Black oil' not only acts as a

caustic, but also, owing to the free sulphurous acid it contains, has antiseptic properties, and is of great value for dressing abscesses and fistulous wounds.

ACIDUM SULPHURICUM DILUTUM.

Diluted Sulphuric Acid.

Mode of Preparation.—Dilute 7 fluid ounces of sulphuric acid carefully with 77 fluid ounces of water, and when the mixture has cooled to 15·5° C. add sufficient water to make the mixture measure 83½ fluid ounces. Should any sediment be formed on standing, decant the clear portion.

Characters.—The specific gravity is 1·094.

Tests.—A quantity weighing 359 grains and measuring 6 fluid drachms, requires for neutralisation 1,000 grain-measures of the volumetric solution of soda. Diluted sulphuric acid therefore contains 13·65 per cent. of real sulphuric acid.

Therapeutics.—Sulphuric acid has astringent, tonic, refrigerant, and antiseptic properties, and externally acts as an astringent, and styptic, and caustic. Internally the diluted acid is useful in much the same instances as the diluted hydrochloric acid.

As a general tonic after debilitating fevers, the diluted sulphuric acid has a valuable effect, and in cases of unduly relaxed bowels and dysentery it frequently proves very beneficial. In cases of dyspepsia, the diluted hydrochloric acid is preferable to sulphuric acid.

In purpura hæmorrhagica it is sometimes administered, but in this disease we prefer the liquid extract of ergot combined with tincture of perchloride of iron, as recommended by Mr. J. B. Gresswell in his 'Veterinary Pharmacology and Therapeutics.'

Diluted sulphuric acid is the most valuable antidote in

cases of lead poisoning, forming with this metal insoluble sulphate of lead. The acid should be freely diluted when administered internally.

Externally.—Diluted sulphuric acid, further diluted with 25 to 50 parts of water, is sometimes used as an astringent application for discharging wounds.

Posology :—

Horses	... 1 to 2 fluid drachms.
Cattle ...	... 2 to 4 fluid drachms.
Sheep ...	... ½ to 1 fluid drachms.
Pigs ...	... 15 to 20 minims.
Dogs ...	... 3 to 6 minims.

ACIDUM SULPHUROSUM.

Sulphurous Acid.

Chemical Composition.—This most important acid consists of the gas, sulphurous anhydride, SO_2, dissolved in water in the proportion of 5 per cent. by weight, and contains 6·4 per cent. of real sulphurous acid, H_2SO_3.

Mode of Preparation.—Place 1 ounce of wood charcoal, broke, into small pieces, together with 4 fluid ounces of sulphurous acid, into a glass flask, which is connected by means of a glass tube with a wash-bottle containing 2 ounces of water. From the wash-bottle let a second gas-delivery tube lead to the bottom of a pint bottle containing distilled water. Now heat the flask until gas is evolved and passes through the water in the wash-bottle into the distilled water, which must be kept cold. The process must be continued until the bubbles of gas pass through the solution apparently undiminished in size, and the strength must be tested according to the test mentioned below. The reaction is represented as follows :—

$$2H_2SO_4 + C = CO_2 + 2SO_2 + 2H_2O.$$

Characters. — Sulphurous acid is a colourless liquid possessing a strong and very characteristic sulphurous odour. The specific gravity is 1·025.

Tests.—Sulphurous acid should give but a very slight precipitate with chloride of barium. If chlorine be added to it, it is converted into sulphuric acid, and then gives a white precipitate of sulphate of barium when chloride of barium is mixed with it. The reaction by which it is transformed into sulphuric acid is thus represented :—

$$SO_2 + 2H_2O + Cl_2 = H_2SO_4 + 2HCl.$$

Sulphurous acid is very liable indeed to decompose, so that it often gives a white precipitate with solution of chloride of barium, thus showing the presence of sulphuric acid. Very often, too, it does not accurately respond to the usual volumetric test. When evaporated it should leave no residue.

Preparation.—Sodii Sulphis.

Therapeutics :—

Actions.—Sulphurous acid is a powerful deoxidizing, disinfectant, and antiseptic agent. It is very destructive to vegetable life, and destroys disease-germs. It arrests alcoholic fermentation by killing the yeast-plant, and it is equally destructive to bacteria and micrococci. It is on this account very efficacious in destroying the spores and hyphæ of ringworm; and it has also been given internally with the view of combating the vegetable germs of the various specific fevers. It decomposes sulphide of hydrogen, and thus proves very useful in directly removing the foul odours which depend on the presence of this gas. It also checks bad smells indirectly, by arresting the process of decomposition which gives rise to them. Liquid sulphurous acid is used both externally and internally, and the gaseous sulphurous oxide also is extensively employed in veterinary practice.

We may first review the medicinal uses of the liquid

sulphurous acid, which is a solution in water of 5 per cent. of the oxide.

Internally this preparation has proved useful in cases of malignant strangles, purpura, and erysipelas in horses. Also in cases of severe influenza it has been employed with good effect. In cattle it has been given for the treatment and prevention of contagious pleuro-pneumonia. In several outbreaks of coughing and diarrhœa in beasts with temperatures of 105° to 106°, and pulses of 100, the liquid acid has proved very efficacious in the hands of Mr. J. B. Gresswell. The outbreaks were attributed to drinking water contaminated with sewage matter. In tympanitis in beasts, the acid is also prescribed, and in this condition it often proves very useful.

Externally the liquid acid has been employed as a lotion, and also as a spray. As a lotion, the acid when diluted with 4 to 6 parts of water, proves very useful in the treatment of foul wounds. Mixed with an equal quantity of glycerine, it proves a very efficacious application for the destruction of the fungus of ringworm. As a spray, the undiluted acid applied for 6 or 8 minutes often arrests, according to Finlay Dun, the pain and inflammation of bruises, strains, or enlarged joints. In cases of sore throat, we have commonly employed the acid freely diluted with water as a gargle; but it is also used as spray in the proportion of 1 part of the acid to 15 parts of water.

Gaseous sulphurous acid, or in more correct language, sulphurous oxide or sulphurous anhydride, is a most valuable disinfectant for stables, sheds, and kennels, in which animals suffering from infectious diseases have been kept. When it is desired to disinfect thoroughly any building, a quantity of sulphur, previously mixed with one-fourth part of its weight of charcoal, should be thrown upon some burning coals or glowing charcoal placed in some

suitable receptacle, such as a brasier, when the gas will be evolved, and speedily permeate the stable. Care must be taken to obviate risks, such as that of the vessel containing the coals being placed near anything likely to catch fire, or that of inhaling the fumes which arise; and, in order that the gas may act the more efficiently, the doors and windows should be speedily closed, as soon as the sulphur is thrown upon the coals. The gas may also be generated by igniting sulphur moistened with methylated spirit. The sulphur in this case should be placed in a strong earthenware vessel. However it is generated, the doors and windows should be kept closely shut, and not be opened for several hours.

In cases of nasal gleet and purulent discharges of the nose, we very frequently cause the animal to inhale the gas, and believe it to be of great efficacy. The late Mr. D. Gresswell, in cases of copious purulent discharge from the nose, used to order the inhalation of the gas generated by igniting sulphur mixed with tincture of iodine, and this treatment is found to be of great value.

A solution of sulphurous acid mixed with glycerine may be applied to the skin to cure parasitic fungi. In man it is very useful in cases of vomiting, especially when the vomited matters present a frothy or yeasty appearance due to the presence of sarcinæ, and to the occurrence of fermentation in the stomach. Applied in the form of spray, it sometimes gives relief in laryngeal phthisis.

Posology:—

Horses and cattle	... 1 to 1½ fluid ounces.
Sheep and pigs	... ½ to 1 fluid drachm.
Dogs ...	... 20 to 30 minims.

It is necessary, in giving sulphurous acid internally, to freely dilute it with water. It should be administered with glycerine, treacle, or mucilage of linseed, and the dose may be repeated every 4 hours, or oftener when necessary.

ACIDUM TANNICUM.

Tannic Acid.

Natural Order.—Galls are excrescences on Quercus lusitanica, which belongs to the Cupuliferæ.

Chemical Composition.—Tannic Acid has the formula $C_{27}H_{22}O_{17}$, or, according to some, $C_{14}H_{10}O_9$.* Sometimes it is mixed with gallic acid, $H_3C_7H_3O_5,H_2O$.

Mode of Preparation.—Expose powdered galls to a damp atmosphere for two or three days, and then add sufficient ether to form a soft paste. Allow this to stand in a well-closed vessel for one day, and then, having quickly enveloped it in a linen cloth, press it strongly in a suitable press, so as to separate the liquid portion. Reduce the pressed cake to powder, mix it with sufficient ether diluted with one-sixteenth of its bulk of water to form again a soft paste, and press this as before. Mix the expressed liquids, and allow the mixture to evaporate spontaneously, until, by the aid of a little heat, it has acquired the consistence of a soft extract. Then place it on earthen plates or dishes, and dry it in a hot air-chamber at a temperature not exceeding 100° C.

Characters.—Tannic acid exists in pale yellow vesicular masses or thin glistening scales. The taste is strongly astringent, and the reaction acid. It is readily soluble in water and rectified spirit, very sparingly soluble in pure ether, but readily in ether containing a very little water. Hence the addition of water, as above set forth, is necessary.

* This latter formula is given by Dr. Brunton. The fact seems to be that our knowledge of the composition of the different substances called tannic acids is very limited. Most of them appear to be glucosides. Strecker assigned the formula first given, but recent experiments show that tannin is a glucoside of tannic acid, and has the composition $C_{34}H_{28}O_{22}$.

Tests.—The aqueous solution added to aqueous solution of gelatine gives a yellowish-white precipitate.

With persalts of iron it gives a bluish-black colour.

Tannic acid leaves no residue when burned with free access of air on platinum foil.

Action.—Tannic acid has little or no action when applied to the unbroken skin; but, when this covering is denuded of its epidermal covering, it coagulates the albumen and causes contraction of the cells of the skin. When applied to mucous membranes it coagulates the mucus.

The astringent action of tannic acid on the skin and mucous membranes is due to this coagulation of albumen, and not to any astringing of the capillaries, which, it may be remarked, have been observed by Rossbach to be dilated by this agent. When taken into the stomach, tannic acid is absorbed into the blood, and passes out as gallic acid. It acts as an astringent on the intestinal canal, and restrains hæmorrhage in distant organs, as the kidneys and uterus. It has a more powerful local action than gallic acid; but, on account of its being less soluble than this agent, it is not so valuable as gallic acid in cases of internal hæmorrhage.

Uses.—Tannic acid is a useful remedy in diarrhœa and dysentery in animals, and may be combined with opium and other remedies. In cases of hæmorrhage from the kidneys and other organs, it is also often prescribed, and may suitably be combined with preparations of ergot.

In cases of poisoning by tartar emetic, tannic acid is indicated, as it forms an insoluble tannate. It is also antidotic to strychnine, morphine, and other alkaloidal poisons.

Externally tannic acid, with an equal quantity of starch powder, is used as an insufflation in cases of copious foul discharge from the nasal mucous membrane, and its employ-

ment in such instances may be daily alternated with that of a mixture of starch and iodoform. The glycerine of tannic acid is a useful application in cases of sore throat or mouth, and, when this preparation is diluted with an equal bulk of water, it proves valuable in cases of otorrhœa in dogs. Although we now chiefly employ the ointment of hamamelis for piles in dogs, Finlay Dun's formula of 1 drachm of tannic acid, 1 drachm of opium with 2 ounces of lard, is a very useful one.

Posology:—

Horses ...	... ½ to 2 drachms.
Cattle ...	... 1 to 3 drachms.
Sheep and pigs	... 15 to 30 grains.
Dogs ...	... 2 to 20 grains.

ACIDUM TARTARICUM.

Tartaric Acid.

Chemical Composition.—Tartaric acid has the formula $H_2C_4H_4O_6$.

Mode of Preparation.—It is prepared from the acid tartrate of potassium, chalk, and chloride of calcium. Tartrate of calcium is formed, and this is decomposed by sulphuric acid.

Characters.—Tartaric acid exists in the form of colourless crystals with strongly acid taste, and readily soluble in less than their own weight of water, and in less than three times their weight of rectified spirit.

Test.—When to a solution in water or in rectified spirit not greatly diluted a little acetate of potassium is added, a white crystalline precipitate is formed.

It leaves no residue when burned with free access of air.

Preparation.—Antimonii Potassio-tartras.

ACONITUM.

ACONITI FOLIA.

Aconite Leaves.

Natural Order.—Ranunculaceæ.

Description.—The fresh leaves and flowering tops of Aconitum Napellus, Monkshood, gathered when about one-third of the flowers are expanded, from plants cultivated in Britain. The reason for collecting at this particular period is that those compounds, which are merely of use as nutriment for the growth of the plant, may be taken up to form new tissues, so that what is left is more highly concentrated. The leaves are said to possess only one-sixth of the activity of the root.

Characters.—Aconite leaves are alternate with long channelled stalks, and are deeply cut palmately into five or three segments, which are again deeply and irregularly divided into oblong acute narrow lobes. A small fragment of a leaf can be recognised. Though extremely poisonous a very minute portion may be slowly chewed, when a sensation of tingling and numbness results.

The *flowers* are deep blue, helmet-shaped, large, irregular, in a somewhat loose terminal raceme.

Preparations:—

Extractum Aconiti.
Unguentum Aconiti.

ACONITI RADIX.

Aconite Root.

General Description.—The root of Aconitum Napellus, collected in the winter or early spring, before the leaves have appeared, from plants cultivated in Britain, and care-

fully dried, or imported from Germany. The root is collected before the appearance of the leaves, because at that time there is manifestly a greater proportionate amount of active matter in it.

Characters.—Aconite root is usually from about two to three inches long, and from one-half to three-quarters of an inch thick at the upper extremity, where it is generally crowned with the remains of the base of the stem. The form is conical, and the root is much shrivelled longitudinally, presenting numerous very small grooves, extending from base to apex. The root is more or less covered with the scars or bases of broken rootlets. It is dark brown externally and whitish within, and has a central cellular axis with about seven rays. The taste is at first somewhat bitterish-sweet, but when chewed, after some minutes a sensation of tingling and numbness is produced which lasts some time.

Preparations :—

Aconitina (the chief active principle).
Linimentum Aconiti, 1 ounce to 1½ fluid ounces.
Tinctura Aconiti, 54½ grains to 1 fluid ounce.
Tinctura Aconiti (Fleming). This tincture is about five times the strength of the above B. P. tincture.
Unguentum Aconiti.

Properties and Composition.—The chief active principle in both leaves and roots is the alkaloid 'Aconitine' or 'Aconitia,' which is combined with 'Aconitic Acid.' This alkaloid is only present in small quantity in the leaves. In the root, resinous, and fatty matters, and several other active principles are also present. Nepaul Aconite or Bikh, the root of Aconitum Ferox, contains an alkaloid called 'Pseudaconitine' which is much more active than 'Aconitine.' Japanese Aconite is said to contain an alkaloid

which is much more powerful even than 'Pseudaconitine.' It is therefore very important indeed that official preparations should be made only from the root of A. Napellus.

ACONITINA.

Aconitine.

Synonym.—Aconitia.

Description.—Aconitine is an alkaloid obtained from aconite root.

Mode of Preparation.—The aconitate of aconitine is dissolved out of the pounded root by macerating in spirit. If ammonia were now added, the aconitine would be set free, but being soluble in spirit would not be precipitated. The spirit is therefore removed by distillation, and the residual extract dissolved in water in which the aconitate of aconitine is soluble, though the alkaloid itself is very sparingly so dissolved. Now by adding ammonia, aconitine is precipitated mixed with colouring matter and other principles. It is then dissolved in ether, which leaves the colouring matter behind. The ether is recovered by distillation, and the aconitine is further purified by dissolving it in water acidulated with sulphuric acid, and re-precipitating by ammonia.

Characters.—Aconitine is a white, usually amorphous, solid, very active poison. It is soluble in 150 parts of cold, and in 50 of hot water, and much more readily soluble in alcohol, in ether, and in chloroform.

Tests.—It turns reddened litmus markedly blue, and neutralizes acids. It is precipitated from solutions of its salts by the caustic alkalies, but not by carbonate of ammonium, or the bicarbonates of sodium or potassium. When heated, aconitine melts and burns with a smoky flame, leaving no residue if ignited with free access of air.

When rubbed on the skin it causes a tingling sensation, followed by prolonged numbness.

Preparation :—

Unguentum Aconitinæ, 8 grains to 1 ounce.

Physiological Action of the Preparations of Aconite.—Aconite, when given internally, reduces the strength of the pulse, and thus retards the circulation. When administered in moderate doses this powerful depressant reduces the number of the beats of the heart, and renders the breathing slower; while, when large or poisonous doses are taken, the pulse is accelerated, and the breathing becomes sharp and hurried. Physiological observers have shown that aconite paralyzes the heart of the dog, arresting its action in systole.

After death from aconite the heart fails to respond to galvanic stimulation; and it is, therefore, believed that this poison affects the cardiac muscle itself.

According to the experiments of Ringer and Murrell, aconite paralyzes all nitrogenous tissues, and affects all the structures of the heart—viz., in the first place its ganglia, next the nerves, and finally the muscular substance. Regarding the action on the nervous system, Boehm concludes that aconitine first paralyzes the sensory, and then the motor, part of the cord; while Liegois and Hottot believe that it first paralyzes the perceptive centres above the spinal cord, and afterwards the terminations, and, lastly, the trunks of the sensory nerves.

The latter observers record that frogs poisoned with aconite lose sensation, whilst voluntary and reflex action remain; and reflex action itself ceases whilst the animal still retains voluntary power.

On administering strychnine, these observers produced tetanus, the paroxysms of which could be excited by

irritating any part of the body. They therefore conclude that at this stage the sensory nerves are not affected, and that anæsthesia depends on the influence of the aconite on the sensory perceptive centres.

After a time, however, irritation of the afferent nerves fails to excite a tetanic paroxysm; wherefrom they conclude that aconite next paralyzes the terminations, and then the trunks of the sensory nerves. According to Ringer, aconite is a protoplasmic poison, and destroys the functions of all the nitrogenous tissues—first of the central nervous system, next of the nerves, and last of the muscles; but it has an especial affinity for the sensory apparatus, paralyzing first the sensory perceptive centres.

Aconite, like tartar emetic and *potash salts*, is a powerful depressant; and Ringer suggests that these drugs do not merely depress through their paralyzing effect on the heart, but that they depress also by their poisonous action on the central nervous system and on the motor nerves.

On the muscles aconite has little or no effect. Under the influence of aconite the temperature falls constantly.

Uses of the Various Preparations of Aconite.—When due care is taken in its administration, aconite is a most valuable remedy in veterinary medicine, and deserves a far more extensive use than has hitherto been general. Nevertheless, it must be emphatically stated that the greatest precaution is necessary in prescribing this most useful drug. When carelessly given in improper doses, and unsuitably or at too frequent intervals, it has too often caused death. Very frequently has it been illustrated how easily death may be caused by those who, uninitiated in the veterinary art, exercise but little caution, and so poison the horses under their charge by overdoses or by too frequent repetition of the proper dose of this medicinal agent.

Aconite is an efficient antipyretic, sedative, diaphoretic, and anodyne, and it is especially valuable in controlling the inflammation and subduing the accompanying fever of many acute febrile disorders. In the febrile condition depending upon local inflammations, such as congestion of the lungs, inflammation of the lungs or pneumonia, pleurisy, laryngitis, mammitis, enteritis, lymphangitis, peritonitis, pericarditis, erysipelas, laminitis, it is of great potency. In cases of colic, aconite has often been administered along with other remedies, more especially sulphuric ether.

In the contagious fevers of animals aconite is not indicated.

In the earlier stages of acute tetanus aconite often is indicated, more especially in those instances where the temperature is high and the animal is highly bred and of a nervous temperament. In this disease it may be administered by the mouth, but it is preferable to employ the hypodermic method. Five to ten minims of Fleming's tincture injected hypodermically have been found by us to be very efficacious in abating the acute symptoms in severe cases. In rabies in horses aconite has not been found of any value (*Vet. Journal*, Nov., 1883).

In treating hypertrophy of the heart in thoroughbreds it has been administered by us, and was found to control the excessive or irregular action of this organ. In frequently repeated doses, Dun has found aconite of benefit at the outset of both forms of puerperal fever in cattle. It has also been given with success to ewes in the lambing season, when 'the animals have a hard time, begin to blow, or show symptoms of fever.'

In dogs aconite has been administered in acute febrile disorders with great advantage, especially in acute pneumonia. Externally aconite is generally employed in the form of the liniment or ointment. As a local anodyne

these preparations have been found very useful in treating painful rheumatic affections. In cases of synovitis the application of the liniment of aconite has a most beneficial effect, and for this purpose we can strongly recommend it.

Posology :—

Tincture of aconite (B. P.).

Horses ...	... 25 to 50 minims.
Cattle ...	... 40 minims to 1 fluid drachm.
Sheep and pigs	... 5 to 10 minims.
Dogs ...	... 3 to 5 minims.

Tincture of aconite (Fleming's).

Horses ...	... 5 to 10 minims.
Cattle ...	... 10 to 15 minims.
Sheep ...	... 1 to 2 minims.
Dogs ...	... $\frac{1}{2}$ to 1 minim.

In veterinary practice either the B. P. tincture or Fleming's is the usual form in which aconite is given. The doses mentioned may be repeated at intervals of about three hours for two or three times. Then if the desired result be not obtained, the dose may be repeated at intervals of four hours.

If the tincture be administered hypodermically half the above doses will suffice.

Aconitine has not, as far as we are aware, been administered medicinally in animals. One-twentieth of a grain of this alkaloid injected hypodermically under the skin of a horse, was found to cause salivation, champing of the teeth, retching, and reduction of the number and force of the heart's action. The ointment of aconitine is far more reliable than the ointment of aconite, but its greater expense has prevented its more general use in veterinary practice.

ADEPS BENZOATUS.

Benzoated Lard.

Mode of Preparation.—Melt 50 parts of prepared lard by means of the heat of a water-bath, add 1 part of benzoin reduced to coarse powder, and frequently stirring them together, heat for two hours. Finally, remove the residual benzoin by straining.

Preparations:—

Unguentum Aconitinæ.
Unguentum Atropinæ.
Unguentum Belladonnæ.
Unguentum Chrysarobinæ.
Unguentum Gallæ.
Unguentum Iodoformi.
Unguentum Simplex.
Unguentum Staphisagriæ.
Unguentum Sulphuris.
Unguentum Zinci Oxidi.

Therapeutics.—Benzoated lard is preferable to ordinary lard, in that it is not liable to become rancid.

ADEPS PRÆPARATUS.

Prepared Lard.

Description.—Prepared lard is simply the purified fat of the hog, Sus scrofa.

Mode of Preparation.—Remove as much as possible of the external membranes from the perfectly fresh internal fat of the abdomen of the hog, and suspend the fat so that it shall be freely exposed to the air for some hours. Cut it into small pieces, and reduce them to a uniform mass, in which the membranous vesicles are completely broken by beating in a stone mortar, or in some other suitable manner.

Now place the mass in a vessel surrounded by warm water, and heat to 54·4° C., until the fat has melted and separated from the membranous matter. Finally strain the melted fat through flannel.

Characters.—Prepared lard is a soft, white fatty substance, which melts at 37·8° C., and has no rancid odour. It dissolves entirely in ether.

Tests :—

Negative.—Distilled water in which prepared lard has been boiled, when cooled and filtered, gives no precipitate with nitrate of silver (absence of chlorides, etc.), and is not rendered blue by solution of iodine (absence of starch).

Therapeutics.—Lard is sometimes given internally in veterinary practice as a demulcent. In constipation in cattle, it is still customary with some to administer internally 1 lb. of melted lard daily as an adjunct to purgatives. It is extensively employed as a vehicle for ointments.

ÆTHER.

Ether.

Synonym.—Sulphuric Ether.

Chemical Composition.—Ether is a volatile liquid prepared from alcohol by distillation with sulphuric acid, and containing not less than 92 per cent. by volume of pure ether, $(C_2H_5)_2O$.

Mode of Preparation.—Take of

Rectified Spirit, 50 fluid ounces ;
Sulphuric Acid, 10 fluid ounces ;
Chloride of Calcium, 10 ounces ;
Slaked Lime, ½ ounce ;
Distilled Water, 13 fluid ounces.

Mix the sulphuric acid with 12 fluid ounces of the spirit in a glass flask with a wide neck, and capable of containing at least 2 pints. Do not allow the mixture to cool. Con-

nect the flask by means of a bent glass tube with a Liebig's condenser, and distil at a temperature which is sufficiently high to maintain the liquid in brisk ebullition. As soon as the ethereal fluid begins to pass over, supply fresh spirit through a tube into the flask in a continuous stream, and in amount sufficient to equal the volume of the fluid which distils over. This may be done by using a tube provided with a stopcock. At one end the tube is connected with a vessel containing the spirit raised above the level of the flask, and below it dips into the acid liquid, passing through a hole in the cork of the flask. When 50 fluid ounces of the spirit have been added, and 42 fluid ounces of ethereal liquid have distilled over, the process may be stopped. Dissolve the 10 ounces of chloride of calcium in the 13 fluid ounces of distilled water, add the lime, and the impure ether. Agitate the mixture in a bottle, and then leave it at rest for 10 minutes. Pour off the light supernatant fluid, and distil it until a glass bead of specific gravity 0·735 placed in the receiver begins to float. When this is the case, the specific gravity of the product is known to be the same. The ether and spirit retained by the residue may always be recovered by distillation, and used in subsequent operations.

Characters.—Ether is a colourless, very volatile, and inflammable liquid of specific gravity 0·735. It emits a strong and characteristic odour. It boils below 40·5° C.

Test.—Ether evaporates without residue. Fifty measures agitated with an equal volume of water are reduced to 45. Thus 10 per cent. is absorbed.

Preparations :—

Æther Purus.
Collodium.
Collodium Flexile.
Spiritus Ætheris.
Spiritus Ætheris Compositus.

Action.—Ether when applied to the skin quickly evaporates, and this causes great coldness, and indeed the surface may in this manner be frozen and rendered quite insensible to pain. In the mouth, ether excites the salivary secretion. When taken into the stomach it stimulates the movements of this organ, dispels flatulence, and increases the flow of the gastric juice. It is believed that it tends also to increase the co-ordination of the movements of this organ and of the intestines, thus diminishing spasm and relieving pain. When ether enters the body it stimulates the circulation, and after stimulating for a very short time the nerve-centres, it depresses them. It first affects the cerebral hemispheres, causing delirium and unconsciousness. It then acts on the grey matter of the spinal cord, after which the white part is also influenced. The cardiac and vaso-motor centres in the medulla oblongata are lastly acted upon. The heart is much less readily paralyzed by ether than by chloroform, and for this reason, death from syncope during operations on dogs is less to be feared, when the former anæsthetic is employed. Chloroform, however, we may mention, is the agent almost exclusively employed for causing anæsthesia in the horse, and its administration, when carefully performed, is very rarely fatal. For dogs we prefer ether to chloroform as an anæsthetic.

Uses.—Ether is administered internally as a powerful and prompt diffusible stimulant. It has also antispasmodic, diaphoretic, and diuretic properties. Externally applied, ether acts as an anodyne, refrigerant, and local anæsthetic. In the form of vapour, when inhaled in sufficient quantity, it causes general anæsthesia.

We may first speak of the use of ether as administered by the mouth. In treating colic in horses, whether of the spasmodic or flatulent type, ether in combination with opium and spirit of nitrous ether has been found to be

invaluable. In treating these disorders, the ordinary dose may be doubled, and the medicine may be given at frequent intervals. Ether is also of great value in relieving flatulence in animals, and is a potent remedy in stomach-staggers of horses. In asthma it relieves the spasmodic contractions of the muscular walls of the small bronchioles. In cases of enteritis in horses, ether has its own peculiar effect in relieving pain, and it wonderfully enhances the action of the hypodermic injection of morphine. As a general diffusible stimulant, ether is also frequently useful in many debilitated conditions in the horse, and, in fact, in all animals.

In cattle and sheep ether is a standard remedy for tympanitis, and also in spasmodic and painful affections of the bowels; and it may be used in rather large doses.

Chloroform is perhaps better adapted as a general anæsthetic in all the domesticated animals, excepting the dog, for which ether is more suitable. For producing local anæsthesia for the purpose of removing tumours and for performing other operations, such, for instance, as that of neurotomy, ether is the agent selected.

We have also used it occasionally for spasms, and have found it most efficacious. It is, however, too expensive for general use for this purpose.

For veterinary practice the commercial methylated ether (*s.g.*, ·724 to ·735) answers as well as pure ether.

Posology.—As an internal remedy:—

Horses ...	... 1 to 2 fluid ounces.
Cattle ...	... 2 to 3 fluid ounces.
Sheep and pigs	... 2 to 4 fluid drachms.
Dogs ...	... ½ to 1 fluid drachm.

As an anæsthetic administered in the form of vapour:—

Horses and cattle	... 3 to 6 fluid ounces.
Dogs ...	... 3 to 4 fluid drachms.

ÆTHER ACETICUS.

Acetic Ether.

Synonym.—Acetate of Ethyl.

Formula.—$C_2H_5C_2H_3O_2$.

Mode of Preparation.—Take of

Rectified Spirit, 32¼ fluid ounces;
Sulphuric Acid, 32½ fluid ounces;
Acetate of Sodium, 40 ounces;
Freshly dried Carbonate of Potassium, 6 ounces.

To the spirit add slowly the sulphuric acid, keeping the fluid cool. The product being cold, add the acetate, mixing thoroughly. Distil 45 fluid ounces. Digest the distillate with the carbonate of potassium for three days in a stoppered bottle. Separate the ethereal fluid, and again distil until all but about 4 fluid ounces has passed over. Preserve the acetic ether thus formed in a well-closed bottle kept in a cool place.

Characters.—Acetic ether is a colourless liquid, with an agreeable ethereal odour. Its specific gravity is about ·9, and its boiling point about 74·4° C. It is soluble in all proportions in rectified spirit and in ether, and in water in the proportion of 1 part in 10 by weight at 15·5° C.

Preparation.—Liquor Epispasticus.

Therapeutics.—Acetic Ether is used in the preparation of Liquor Epispasticus.

ALOES.

ALOE BARBADENSIS.

Barbadoes Aloes.

Natural Order.—Liliaceæ.

Description.—The inspissated juice which flows from the transversely cut bases of the leaves of Aloe vulgaris. It

is imported from Barbadoes and the Dutch West Indian Islands, and is known in commerce as Barbadoes and Curaçoa aloes.

Characters.—Barbadoes aloes is almost entirely soluble in proof spirit. The colour varies from deep reddish-brown or chocolate-brown to dark brown or black. The fracture is dull and waxy or glassy. In mass it is opaque, but thin films are translucent and of an orange-brown tint. The powder is dull olive-yellow. The odour is strong and disagreeable, especially when the aloes is breathed upon; while that of Socotrine aloes is not unpleasant. The taste is exceedingly bitter and nauseous. The Curaçoa variety is generally more glassy and translucent than the ordinary Barbadoes kind, and has a distinctive odour. When a thin stratum of Barbadoes aloes is moistened with rectified spirit and examined under the microscope, numerous crystals are seen.

Preparations:—

Aloin.
Enema Aloes.
Massa Aloes.

ALOE CAPENSIS.

Cape Aloes.

Natural Order.—Liliaceæ.

Description.—Cape aloes is the inspissated juice of the leaf of Aloe spicata, and several other allied species. It is imported from the Cape of Good Hope in skins and in chests.

Composition.—Similar to that of Aloe Barbadensis.

Characters.—Cape aloes has a glossy and resinous appearance. Its colour is dark-brown with a strong greenish-yellow shade. The odour is strong but not disagreeable. The taste is acrid and bitter. It is very brittle, being not

unlike resin in this matter. It is readily powdered, and the powder has a strong greenish-yellow colour.

Preparations, etc.—Similar to those of Barbadoes aloes. Cape aloes is scarcely so certain in its action as Barbadoes.

ALOE SOCOTRINA.

Socotrine Aloes.

Natural Order.—Liliaceæ.

Description.—The juice, when inspissated, which flows from the transversely cut bases of the leaves of Aloe Perryi; and probably other species. It is imported principally by way of Bombay and Zanzibar, and is known in commerce as Socotrine and Zanzibar aloes.

Characters.—Socotrine aloes is much lighter in colour than the other two varieties, being of various shades of reddish-brown. It darkens by exposure to the air; sometimes it is more or less opaque and liver-coloured, and is then called hepatic aloes. The fracture is usually smooth and resinous, or rarely rough and irregular. In thin films it is transparent, and orange-red or orange-brown. The powder is bright brown. The odour is strong and rather agreeable. The taste is very bitter. Like Barbadoes aloes, when moistened with rectified spirit and examined in a thin layer under the microscope, it exhibits numerous crystals, and it is similarly soluble almost entirely in proof spirit.

Preparations.—Same as those of Barbadoes aloes.

ALOIN.

Aloin.

Chemical Composition.—Aloin is a crystalline substance obtained from aloes by solvents, and purified by re-crystallisation. Aloin differs slightly according to the kind of aloes from which it is prepared; but the medicinal properties are similar.

Characters.—Aloin exists in tufts of acicular crystals, which are yellow, inodorous, and have the taste of aloes.

It is sparingly soluble in cold water, more so in cold rectified spirit, and freely soluble in the hot fluids, but insoluble in ether. It is not readily altered by acidified or neutral solutions; but is rapidly altered by alkaline fluids.

ACTION OF ALOES.

Aloes acts upon the stomach and intestines as a bitter and purgative. Its chief purgative action is upon the colon and distal part of the small gut. Although one of the slowest of the purgatives, aloes is a reliable and valuable cathartic in horses. Its action as a purgative is due to the increase of the peristaltic action of the bowels, and to the augmentation of the flow of secretion from the glands of the intestinal mucous membrane. It also increases the flow of the bile. Aloes produces its action by whatever channel it enters the system, and of all cathartics is the one most suitable for equine practice. On ruminants its action is much less certain. This is attributable to the fact that in these animals the part of the gut on which aloes chiefly acts is not nearly so large as in the horse, while at the same time the stomach of ruminants is much more complex than in horses. In pigs aloes is a very useful purgative. In dog practice aloes is not so prompt in its action as castor oil, jalap, syrup of buckthorn, and preparations of mercury.

Of the varieties of aloes, Barbadoes is the most active, and is the kind most used in veterinary practice.

East Indian aloes is not quite so potent, and Cape aloes has a still milder effect. These two latter varieties, if given in somewhat larger doses than the Barbadoes aloes, are said to have quite as good an effect as the Barbadoes aloes. The

Cape variety is especially serviceable in cases where it is desired to produce catharsis in a horse recently taken up from grass.

The nauseating and griping effect of aloes may be obviated somewhat by giving it with aromatics, such as ginger, cloves, or peppermint.

Aloin, the active principle of aloes, has not been as yet extensively used in veterinary practice. On the horse it has, however, a somewhat better action than aloes, inasmuch as it is not so liable to cause nausea and griping. On cattle its action is also perhaps better than that of aloes. To dogs, like aloes, aloin must be given in large doses to produce any effect.

Uses.—In equine practice aloes is very extensively administered, in cases of constipation, obstruction of the bowels, colic, and dyspepsia. In cases of prolonged constipation in horses, when an immediate action of the bowels is requisite, the injection of sulphate of eserine into the jugular vein * has been lately practised as a very efficient means of causing evacuation of the bowels. In habitual constipation in horses, small doses of aloes given in conjunction with strychnine prove very useful.

In treating most of the acute inflammatory diseases of the horse, especially in plethoric cases, aloes may be given with advantage in the first stages of the disease in doses of 2 to 3 drachms only. In laminitis, hepatitis, lymphangitis and as a vermifuge, aloes may be given in full doses. In cases of mammitis and laryngitis a moderate dose of 4 drachms, and in cases of pneumonia, pleurisy, erysipelas, influenza, and strangles about 2 drachms, may be given. In congestion or inflammation of the liver in horses, aloes is indicated in full doses. When employed as a vermifuge after a fast, aloes should also be given in full doses.

* Vide Physostigmina.

For the latter purpose it may be given alone or with anthelmintics, such as oil of turpentine, or it may be administered on the day following the administration of santonine, filix mas, or other remedies. In the form of an enema aloes is sometimes used to expel worms in the rectum.

In various kinds of lameness and wounds in horses attended with febrile action, aloes is commonly given with good effect.

In cattle and sheep aloes is seldom administered alone, being usually combined with sulphate of magnesium or sodium, or more powerful cathartics. Aloes is not often given to dogs.

Posology :—

Aloes as a cathartic :—

Horses ...	... 2 to 8 drachms.
Cattle ...	... 4 to 12 drachms.
Sheep ...	... 2 to 6 drachms.
Swine ...	... 1 to 4 drachms.
Dogs ...	... 20 grains to 1½ drachms.

Aloes as a laxative and alterative.—The dose is about one-eighth part of the above.

Aloes is administered in equine practice in the form of a ball or sometimes in the form of solution. The mass of aloes, the composition and manufacture of which we give (massa aloes), will be found very efficient and reliable.

Aloin :—

Horses ...	... 2 drachms.
Ox ...	... 2 to 3 drachms.
Dog ...	... 20 grains to 1 drachm.

ALUMEN.

Alum.

Chemical Composition.—The formula for potash alum is :—

$$Al_2 3SO_4, K_2SO_4, 24H_2O,$$

and for ammonia alum :—

$$Al_2 3SO_4, (NH_4)_2SO_4, 24H_2O.$$

Characters.—Alum exists in colourless, transparent, octahedral crystalline masses, and possesses an acid, sweetish astringent, and not unpleasant taste. It is soluble in 10 or 11 parts of water at ordinary temperatures.

Tests.—An aqueous solution gives with potassium or sodium hydrate a white precipitate soluble in excess of the reagent.

With solution of chloride of barium a white precipitate is at once yielded.

On the addition of ferrocyanide or ferricyanide of potassium no blue colour is produced.

Therapeutics.—Alum has astringent and styptic effects, and is chiefly used for external purposes.

Alum coagulates albumen, and is absorbed into the blood probably as an albuminate. It has been employed in conjunction with other astringents in cases of diarrhœa, dysentery, and hæmorrhage from the kidneys. In lead poisoning it is also commonly administered. In cattle it is frequently used for arresting the secretion of milk.

Externally alum is used in solution or as a powder. In weak solution it is used as an injection in discharges from the vagina, uterus, and urethra. As an astringent wash in conjunctivitis, although sometimes used, it cannot be recommended. As a powder alum arrests bleeding. As a strong solution or as a powder it has been used in cases of foul discharge from the nostril.

Posology :—

Horses and cattle	... 2 to 4 drachms.
Sheep and pigs	... 20 grains to 1½ drachms.
Dogs	... 10 to 20 grains.

ALUMEN EXSICCATUM.

Dried Alum.

Chemical Composition.—The formula is $Al_2 3SO_4, K_2SO_4$.

Mode of Preparation.—Heat the alum in a porcelain or other vessel until it liquefies. Then raise the heat, not allowing it to exceed 204·4° C., and continue heating, until aqueous vapour ceases to be set free. The salt will then have lost 45½ per cent. of its weight. Reduce the residue to powder, and preserve in a well-stoppered bottle.

Character.—It is slowly but completely soluble in water.

Therapeutics.—Dried alum is very little used. It has the property of absorbing water, and is somewhat caustic if the skin be broken, as, for instance, over ulcers. It is sometimes dusted over wounds to destroy exuberant granulations.

AMMONIACUM.

Ammoniacum.

Description.—Ammoniacum is a gum-resinous exudation from the stem of Dorema Ammoniacum, after it has been punctured by beetles.

Characters. — This substance occurs in the form of roundish tears which vary in size from that of a coriander fruit to that of a cherry, or in nodular masses of agglutinated tears of various sizes and forms. When fresh the substance is pale yellowish-brown externally, but when kept darkens, becoming crimson-brown. Internally it is milky white and opaque. When cold it is hard and brittle, and breaks with a dull waxy fracture; but it is readily

softened by heat. The odour is faint, peculiar, and non-alliaceous. The taste is bitter and acrid. It forms when triturated with water a nearly white emulsion.

Tests.—Hydrate of potassium colours it yellow.

A solution of chlorinated soda imparts to it a bright orange hue.

Therapeutics. — Ammoniacum is used in veterinary practice for making charges and plasters. Internally it acts as a disinfectant expectorant, but is very seldom prescribed in the domesticated animals.

AMMONII BENZOAS.

Benzoate of Ammonium.

Chemical Composition.—The formula is $NH_4C_7H_5O_2$.

Mode of Preparation.—Dissolve 2 ounces of benzoic acid in 3 fluid ounces of solution of ammonia, which have been mixed with 4 fluid ounces of distilled water. Evaporate, adding if necessary a little ammonia, so that it may be in slight excess, and allow crystals to form.

Characters.—Benzoate of ammonium occurs in colourless laminar crystals. It is soluble in water and in alcohol.

Tests.—Like all other salts of ammonia, when heated with hydrate of potassium, it evolves the gas ammonia.

With ferric salts it gives a bulky yellowish precipitate.

If hydrochloric acid is added to a fairly strong solution, benzoic acid is deposited.

It sublimes when heated, without residue.

Therapeutics.—Benzoate of ammonium, being much less irritant than benzoic acid, can be given in larger doses.

Its actions and uses are similar to those of the acid.—*Vide* Benzoic Acid.'

Posology :—

Sheep	...	... 4 drachms.
Dog	...	... ½ to 1 drachm.

AMMONII BROMIDUM.

Bromide of Ammonium.

Formula.—NH_4Br.

Mode of Preparation.—Bromide of ammonium may be formed by neutralising hydrobromic acid with the gas ammonia or solution of ammonium hydrate, evaporating and allowing to crystallise.

Characters.—Bromide of ammonium exists in the form of colourless crystals, which, after exposure to the air become slightly yellow. It should therefore be kept, as should also the iodide of ammonium and the iodide and bromide of potassium, in bottles covered with paper. The taste of this salt is pungent and saline in character. On the application of heat, bromide of ammonium can be sublimed without change. It is readily soluble in water, but less so in spirit.

Tests :—

Quantitative.—A quantity weighing 5 grains dissolved in a fluid ounce of distilled water to which 2 drops of solution of yellow chromate of potassium have been added, requires not more than 514·5 grain-measures, and not less than 508·5 grain-measures of the volumetric solution of nitrate of silver to produce a permanent red precipitate.

Therapeutics and Posology. — The therapeutics and posology of bromide of ammonium are nearly the same as those of the other bromides, and the reader is referred for their description to potassium bromide. Ammonium bromide contains more bromine than the potassium or sodium salt.

AMMONII CARBONAS.

Carbonate of Ammonium.

Synonym.—Ammoniæ Sesquicarbonas.

Formula.—$N_3H_{11}C_2O_5$.

Mode of Preparation.—Carbonate of ammonium is produced by submitting a mixture of sulphate or chloride of ammonium with carbonate of calcium to sublimation and re-sublimation. It may be looked upon as a compound of acid carbonate of ammonium (NH_4HCO_3) with carbamate of ammonium ($NH_4NH_2CO_2$).

Characters.—Carbonate of ammonium is a volatile and pungent salt existing in translucent crystalline masses. It possesses a strong ammoniacal odour, and a marked alkaline reaction. It is soluble in cold water, and more sparingly in spirit.

Tests.—When heated it volatilises entirely, and is readily dissolved by acids with effervescence.

If diluted nitric acid be added to it in slight excess, and the solution be boiled, it will give no precipitate with solution of chloride of barium or nitrate of silver.

Quantitative.—A quantity weighing 52·3 grains, dissolved in 1 ounce of distilled water, can be neutralised by 1,000 grain-measures of the volumetric solution of oxalic acid.

Preparations.—Liquor Ammonii Acetatis Fortior.
Spiritus Ammoniæ Aromaticus.

Therapeutics.—The action of ammonium carbonate, although not so powerful and irritating as ammonia, is, nevertheless, similar. Ammonium carbonate is very largely used in veterinary medicine. As a stimulant in conjunction with vegetable and mineral tonics, no remedy is so valuable for horses in the later stages of many debilitating diseases, such as influenza, strangles, scarlet fever, purpura, and others. In chronic bronchitis, and in the later stages of

pneumonia and of acute bronchitis, ammonium carbonate acts well, owing to its influence in stimulating the respiratory centre, and promoting the expectoration of mucus. In cases of dyspepsia and flatulence it is very useful, and in flatulent colic it has a very good action in expelling the flatus. In the treatment of puerperal apoplexy in cows, ammonium carbonate in full doses frequently repeated is invaluable. In tympanitis in cattle, ammonium carbonate is very effectual; and in dyspepsia in dogs it may very advantageously be given with spirit of chloroform.

As a local application, ammonium carbonate in solution neutralises the poison of wasps' stings.

Posology :—

Horses	... 1 to 3 drachms.
Cattle ...	... 3 to 6 drachms.
Sheep and pigs	... 15 to 30 grains.
Dogs ...	... 3 to 8 grains.

Ammonium carbonate is usually administered in the form of a ball in horses, but in other animals, and in horses also, where it is desired to have an immediate effect, it is best given in solution.

The spirit of ammonia is the preparation we usually employ when it is desired to administer the drug in liquid (see Spiritus Ammoniæ).

AMMONII CHLORIDUM.

Chloride of Ammonium.

Synonym.—Sal Ammoniac.

Formula.—NH_4Cl.

Mode of Preparation.—Chloride of ammonium may be formed by neutralising hydrochloric acid with gas-liquor, or ammonia, or carbonate of ammonia, and evaporating to dryness. The crystals may be purified by sublimation.

Characters.—Chloride of ammonium exists in colourless,

inodorous minute crystals, or in translucent fibrous masses which are tough and difficult to powder. It is soluble in water and in rectified spirit.

Tests.—This salt gives the reactions of a salt of ammonium and those of a chloride.

When heated, it volatilises without change and leaves no residue.

Preparations :—

Liquor Hydrargyri Perchloridi, $\frac{1}{2}$ grain in 1 fluid ounce.

Liquor Ammoniæ Fortior.

Lotio Ammonii Chloridi cum Potassii Nitrate.

Therapeutics.—Chloride of ammonium is stimulant, and diuretic, and diaphoretic. It is not much used internally in veterinary practice, but is sometimes prescribed in congestion of the liver, and in the later stages of pneumonia and bronchitis in horses. It stimulates the mucous surfaces and glands of the body, acting especially on the liver.

Externally, a solution of chloride of ammonium and nitre in water is often used as a cooling apparatus for sprains and bruises.

Posology.—The dose of chloride of ammonium is about one and a half times that of the carbonate.

AMYGDALA AMARA.

Bitter Almond.

Description.—The ripe seed of the bitter almond tree, Prunus Amygdalus, var. amara, resembles the sweet almond in appearance, but is distinguished by being broader and shorter, by its very bitter taste, and by the fact than an aqueous emulsion has an odour like that of ratafia or of peach-blossoms.

It yields by expression, Oleum Amygdalæ.

AMYGDALA DULCIS.

Sweet Almond.

Description.—This is the ripe seed of the sweet almond tree, Prunus Amygdalus, var. dulcis, imported from Malaga and known as the Jordan almond. The sweet almond is about an inch or somewhat more in length, nearly oblong in form, pointed at one end and round at the other, and covered by a scurfy cinnamon-brown coat. The taste is bland, sweet, and nutty. When triturated with water, it forms a white emulsion of an agreeable taste, which differs from that of the bitter almond in not possessing any marked odour.

Preparation.—Oleum Amygdalæ.

AMYL NITRIS.

Nitrite of Amyl.

Chemical Composition.—The liquid named as above consists chiefly of pure nitrite of amyl, $C_5H_{11}NO_2$.

Mode of Preparation.—It is produced by the action of nitric or nitrous acid on amylic alcohol. It should be stored in hermetically-sealed vessels or in well-stoppered bottles, and kept in a cool and dark place.

Characters.—It is an ethereal liquid of a yellowish colour, and possesses a peculiar and not disagreeable odour. The specific gravity is 0·88, and it volatilises at about 128° to 132° C. When distilled, about 70 per cent. passes over at about 95° C. Nitrite of amyl is insoluble in water, but is soluble in rectified spirit in all proportions.

If it be added drop by drop to fused hydrate of potassium, valerianate of potassium is formed.

Action.—The specific action of nitrite of amyl is almost restricted to its influence on the vascular system. The

whole arterial system is relaxed, and the arterial blood pressure is greatly reduced. This vascular relaxation is either due to the action of the drug on the vaso-motor centre in the medulla, or to its action on the vaso-motor nerves and muscular walls. The heart's action is greatly accelerated. It has been shown by Dr. Wood that the loss of the reflex irritability and voluntary power is owing to the depressing action of the nitrite on the motor tracts of the cord, and, to a slight extent, on the motor nerves and on the muscles.

It lowers the temperature by checking oxidation.

Uses.—Nitrite of amyl has not been much employed as yet in veterinary practice.

In the treatment of idiopathic and traumatic tetanus in horses it has been tried by many, and although favourable results have been recorded, our experience does not lead us to have any confidence in its value. In angina pectoris in horses, the nitrite of amyl has been administered by Professor Williams with success. In asthma in horses it has also been administered with great advantage. It is also antidotic to strychnine poisoning. Nitrite of amyl is administered as an inhalation, or hypodermically, or as a draught by the mouth. With the object of dispelling spasmodic affections, such as of the bronchial tubes, it is best given in the form of an inhalation or by the mouth. In the treatment of tetanus, it is best given hypodermically.

Posology.—By the mouth or hypodermically.

By inhalation.

Horses and cattle ...	10 to 20 minims.
Dogs	$\frac{1}{2}$ to 3 minims.

Four times the above doses may be given.

AMYLUM.

Starch.

Natural Order.—Graminaceæ.

Formula.—$C_6H_{10}O_5$.

Description.—Starch procured from the grains of common wheat, Triticum sativum; maize, Zea Mays; and rice, Oryza sativa.

Characters.—Starch is white and inodorous, and exists in fine powder, or in irregular angular or columnar masses, which can be readily reduced to powder. When viewed under a microscope, the following characters may be seen :—

Wheat Starch appears as a mixture of large and small granules which are lenticular in form, and marked with faint concentric striæ surrounding a central hilum.

Maize Starch.—The granules are more uniform in size, frequently polygonal, a little smaller than the granules of wheat starch, and they possess a very distinct hilum, but are without evident concentric striæ.

Rice Starch.—The granules are minute, nearly uniform in size and polygonal, with small hilum and without striæ.

Starch grains are ellipsoidal. When magnified, a light spot and around it concentric lines are seen. The light spot is called the nucleus or hilum, and contains water. The layers external to it contain alternately less and more water, and the most external layer, which has been formed last, contains the least water. Under the influence of polarized light most starches show a black cross. Every starch granule consists of starch granulose, which becomes blue when acted upon by iodine, and of starch cellulose, which becomes blue when iodine and sulphuric acid are added to it. If acted upon by saliva or diluted acid, starch granules give up the granulose, while the cellulose which remains maintains the form of the granules.

Tests.—When starch is lightly rubbed with a little cold distilled water, the mixture is neither acid nor alkaline, and the filtered liquid does not become blue when solution of iodine is added.

If starch is mixed with boiling water and cooled, the solution gives a deep blue colour with iodine, which disappears in warming and reappears on cooling.

Preparations :—

Glycerinum Amyli, 1 part in 10 by weight.
Mucilago Amyli, 12 grains to 1 fluid ounce.

Therapeutics.—Mucilage of starch is the vehicle of many of the enemata, being demulcent and emollient in its action on the mucous membranes. In relaxed conditions of the bowels, it is a very suitable medium in which to administer astringent medicines by the mouth or by the rectum. Starch is also a suitable medium for the administration of many medicines, and is antidotic to iodine poisoning. Externally, starch is protective and absorbent in the form of dusting powder. It is a suitable basis for making antiseptic and drying powder. Mixed with equal parts of calomel and iodoform, it is very useful in nasal gleet, in which cases it may be injected into the nostrils by an insufflator. It is used externally in the making of starch bandages for fractured limbs.

ANISI FRUCTUS.

Anise Fruit.

Natural Order.—Umbelliferæ.

Description. — This is the dried fruit of Pimpinella Anisum. With the exception of the Russian variety, which is shorter, anise fruits are about one-fifth of an inch in length, greyish-brown, ovoid oblong, and covered entirely with short hairs. The two constituent mericarps of each fruit are united, and attached to a common stalk. Each

mericarp is traversed by five pale slender entire ridges, and the transverse section exhibits about fifteen vittæ. Anise fruit has an agreeable aromatic odour, and a sweetish spicy taste.

Preparation.—Oleum Anisi.

Therapeutics.—Anise is aromatic, stomachic, and carminative. On the bronchial mucous membrane it has a specially stimulant action, like ammoniacum. In cattle it is a diuretic. Anise is used in veterinary practice, chiefly as a flavouring agent in the preparation of tonic, alterative, and condition powders.

The oil of anise is sometimes used in the preparation of aloes mass with the view of preventing griping and nausea, and in other masses as a carminative.

Posology :—

Horses ...	... 1 to 1½ ounces.
Cattle ...	... 2 to 4 ounces.
Sheep and pigs	... 2 to 4 drachms.

ANISI STELLATI FRUCTUS.

Star-Anise Fruit.

Natural Order.—Magnoliaceæ.

Description.—The above is the dried fruit of the plant Illicium Anisatum, cultivated in China. Star-anise fruit is generally composed of eight fully developed carpels, diverging horizontally in a stellate manner from a short, central, generally stalked axis. Each carpel is boat-shaped, more or less beaked, irregularly wrinkled, rusty-brown in colour, and commonly split on its upper margin, so as to expose its solitary, flattish, smooth, shining, somewhat oblique, reddish-brown seed. The odour and taste of both pericarp and seed closely resemble anise fruit.

Preparation.—Oleum Anisi.

Therapeutics.—Star-anise fruit is only used for manufacturing the oleum anisi.

ANTHEMIDIS FLORES.

Chamomile Flowers.

Natural Order.—Compositæ.

Description.—The dried single and double flower-heads or capitula of Anthemis nobilis. The plants are cultivated. The single chamomile flowers of commerce are those in which the capitula have some yellow tubular florets in the centre, surrounded by a varying number of white ligulate ones. The double flowers are those in which all or nearly all the florets are white and ligulate. In both kinds the receptacle is solid, conical, and densely covered with chaffy scales. Both varieties, but especially the single, have a strong aromatic odour and very bitter taste.

Preparation.—Extractum Anthemidis.

Therapeutics.—Chamomile flowers have aromatic, stomachic and tonic properties. They are seldom given in veterinary practice. The extract is a carminative and stomachic for adding to purgatives in pills for dogs.

Posology :—

Horses and cattle	... 1 to 2 ounces.
Sheep and pigs	... 1 to 2 drachms.

ANTIMONIUM.

Antimony.

Symbol and Atomic Weight.—Sb=120.

In the metallic state, antimony is not employed for medicinal purposes. The symbol Sb is derived from the Latin word Stibium. All the preparations are obtained from the native or black tersulphide, the most abundant ore.

Preparations, containing antimony in different combinations :

Antimonii Oxidum.
Antimonium Nigrum Purificatum.
Antimonium Sulphuratum.
Antimonii Potassio-Tartras.
Liquor Antimonii Chloridi.
Pulvis Antimonialis.
Unguentum Antimonii Potassio-Tartratis.
Vinum Antimoniale.

ANTIMONII OXIDUM.

Oxide of Antimony.

Formula.—Sb_2O_3.

Mode of Preparation.—Pour 16 fluid ounces of solution of chloride of antimony into 2 gallons of water, and mix thoroughly. Allow the precipitate to settle; remove the supernatant liquid by a syphon. Add 1 gallon of distilled water, mix well; let the precipitate subside as before, and again withdraw the supernatant fluid. Once more repeat the process described. Add 6 ounces of carbonate of sodium dissolved in 2 pints of distilled water. Leave them in contact for half an hour, stirring frequently; collect the deposit on a calico filter, and wash with boiling distilled water until the washings cease to give a precipitate with a solution of nitrate of silver, acidulated by nitric acid. Dry the product at a temperature not exceeding 100° C.

Characters.—A greyish-white powder, fusible at a low red heat, insoluble in water, but readily dissolved by hydrochloric acid.

Tests.—The solution in hydrochloric acid when dropped into distilled water gives a white deposit, which is at once changed to orange by sulphuretted hydrogen.

It dissolves entirely when boiled with an excess of the acid tartrate of potassium.

Preparations :—

Antimonii Potassio-Tartras.
Pulvis Antimonialis, 1 part in 3.

Therapeutics.—The oxide of antimony is used in the preparation of antimonial powder, and of tartar emetic or potassio-tartrate of antimony. It is not much given in veterinary practice, but its actions and uses are very similar to those of tartar emetic.

ANTIMONIUM NIGRUM PURIFICATUM.

Purified Black Antimony.

Description.—The above is native sulphide of antimony, Sb_2S_3, purified. To free it from siliceous matter it is fused. It is then reduced to fine powder, and, if it still contains any soluble salt of arsenium, it is further purified by being macerated and washed with ammonia. A quantity of it is macerated with 8 fluid ounces of solution of ammonia for five days, being frequently well stirred. Allow the powder to subside, pour off the supernatant liquid, and thoroughly wash the residue with water. Dry the powder by heating it. Black antimony, as thus purified, is a greyish-black crystalline powder. It dissolves almost entirely in boiling hydrochloric acid, giving off the gas, sulphide of hydrogen.

Tests.—A solution in hydrochloric acid gives a white precipitate when poured into water.

If 1 grain be dissolved in hydrochloric acid, and the solution slightly diluted be gently warmed with a piece of bright copper foil, the latter should, when washed, dried, and heated in a dry narrow test-tube, give rise to no crystalline sublimate of arsenious anhydride on the upper cool part of the tube.

Preparations :—

Antimonium Sulphuratum.
Liquor Antimonii Chloridi.

Therapeutics.—Purified black antimony is used in the preparation of sulphurated antimony and of solution of chloride of antimony.

ANTIMONIUM SULPHURATUM.

Sulphurated Antimony.

Description.—The above is a mixture containing sulphide and oxide of antimony, Sb_2S_3 and Sb_2O_3.

Mode of Preparation.—Mix 10 ounces of purified black antimony with 10 ounces of sublimed sulphur and 4½ pints of solution of soda, and boil for two hours, stirring frequently and adding distilled water from time to time in order to maintain the same volume. While it is still hot, add 9 pints of boiling distilled water. Strain the liquor through calico, and, before it cools, add to it by degrees a sufficient quantity of diluted sulphuric acid until the acid is in slight excess. Collect the precipitate on a calico filter, wash with distilled water until the washings no longer give a precipitate with chloride of barium, and dry at a temperature not exceeding 100° C.

Characters.—Sulphurated antimony is an orange-red powder, readily dissolved by solutions of hydrate of sodium, and also by hot hydrochloric acid, with the evolution of sulphide of hydrogen and the separation of sulphur.

Test.—A quantity weighing 60 grains moistened and warmed with successive portions of nitric acid until red fumes cease to be evolved, and then dried and heated to redness, gives a white residue weighing about 40 grains.

Therapeutics.—Sulphurated antimony is seldom employed in veterinary practice. As an alterative, however, it is a useful remedy in cases of eczema and humour in the horse.

Posology.—Horse, ½ to 1 drachm.

ANTIMONII POTASSIO-TARTRAS.

Potassio-Tartrate of Antimony.

Synonyms.—Antimonium Tartaratum, Tartarated Antimony, Tartar-Emetic.

Chemical Composition. — The formula of this salt, which is an oxytartrate of antimony and potassium, is $(KSbOC_4H_4O_6)_2H_2O$.

Mode of Preparation.—Mix 5 ounces of oxide of antimony and 6 ounces of finely-powdered acid tartrate of potassium with sufficient distilled water to form a paste, and set aside for twenty-four hours. Then add about 2 pints of distilled water, and boil for a quarter of an hour, stirring frequently. Filter, and set aside the clear filtrate to crystallize. Pour off the mother liquor, evaporate to one-third, and set aside that more crystals may form. Dry the crystals on filtering paper at the ordinary temperature.

Characters. — Potassio-tartrate of antimony occurs in colourless transparent crystals exhibiting triangular facets, soluble in water, and less so in proof spirit. It decrepitates and blackens upon the application of heat.

Tests.—An aqueous solution gives with hydrochloric acid a white precipitate, soluble in excess, which is not formed if tartaric acid be previously added. A quantity weighing 29 grains dissolves slowly, but without residue, in a fluid ounce of distilled water at 15·5° C., and the solution gives, with sulphuretted hydrogen, an orange precipitate, which, when washed and dried at 100° C., weighs 15·1 grains.

Preparations :—

Unguentum Antimonii Potassio-Tartratis.
Vinum Antimoniale.

Action.—In large doses tartar emetic is an irritant poison,

causing severe gastro-intestinal inflammation. Locally applied, it has an irritant effect, causing pain, heat, and redness, and the appearance of papules which become pustular.

When taken internally in medicinal doses tartar emetic has sedative and antiphlogistic and alterative effects on horses and cattle and sheep. On the carnivora, as the dog and cat, and on the pig, it acts as an expectorant and diaphoretic, and in somewhat larger doses as an emetic and sedative. Tartar emetic does not produce any nauseating effect on horses or cattle, even though it be given in very large quantities. Half-ounce doses even do not cause nausea.

The effect of tartar emetic as an emetic is partly direct, due to the irritant action of the drug upon the walls of the stomach; partly indirect, from immediate stimulation of the vomiting centre in the medulla.

Uses.—Tartar emetic, owing to the small action which it is capable of exerting on the horse, is not very often administered in equine practice. In the first stage of acute inflammatory diseases, such as pneumonia, bronchitis, and laminitis, in strong subjects it proves a useful adjunct with other remedies. As an anthelmintic tartar emetic has not much efficacy, although it is commonly administered with the object of destroying ascarides and oxyurides. It is believed by some that its properties as an anthelmintic are owing to its aiding the action of the purgatives, with which it is sometimes administered. If tartar emetic be given as a vermicide, a smart aloes purge should be administered on the following morning.

In pigs, dogs, and other carnivora, tartar emetic is given as an emetic at the commencement of acute inflammation of the lungs, bronchi, larynx, or liver, with the view of promoting secretion from the mucous membrane of the bronchial tubes and stomach. Tartar emetic is given in

less doses at regular intervals in pneumonia, laryngitis, and other acute inflammations, with the object of promoting diaphoresis and expectoration where the bronchi, larynx, or lungs are inflamed. As an emetic it is not suitable in cases of poisoning, where rapid evacuation is of the first importance, or where there is much general depression, or where the toxic agent is of an irritant character.

As an external irritant tartar emetic is not to be recommended, it being liable to cause sloughing of the tissues. One part of tartar emetic to four of adeps is occasionally added to blistering ointments.

Posology:—

Alterative.

Horses and cattle	... $\frac{1}{2}$ to 1 drachm.

Diaphoretic.

Dogs and cats...	... $\frac{1}{8}$ to 1 grain.

Sedative.

Horses and cattle	... 1 to 4 drachms.
Dogs and cats...	... $\frac{1}{8}$ to 2 grains.

Emetic.

Pigs	... 4 to 10 grains.
Dogs and cats...	... $\frac{1}{4}$ grain to $1\frac{1}{2}$ grains.

Vermifuge.

Horses ...	... 1 to 2 drachms.

ARECÆ SEMINA.

Areca Seeds.

Synonym.—Areca nut.

Natural Order.—Palmaceæ.

Description.—Areca seeds are the seeds or kernels of the fruit of the catechu or betel-nut palm, Areca Catechu. The medicinal properties depend upon the tannic and gallic acids they contain. They are spheroidal, about $\frac{3}{4}$ inch in

diameter, hard, reddish brown in colour, and astringent in taste.

Therapeutics.—Areca nut is an astringent, and is a valuable anthelmintic, especially for dogs. The pulverized nut may be given in the form of a ball, or in milk on an empty stomach. It is generally rapid in its action, and proves destructive equally to tape or round worms. The dose may, if necessary, be repeated twice in close succession. It is then advisable, if the worms be not evacuated, to give some purgative, such as jalap or castor oil, with a dose of oil of turpentine.

Posology:—

Horses...	... 4 to 8 drachms.
Dogs ...	... 20 grains to 2 drachms.

APOMORPHINÆ HYDROCHLORAS.

Hydrochlorate of Apomorphine.

Description.—The above is a hydrochlorate of an alkaloid, obtained by heating morphine or codeine in sealed tubes with hydrochloric acid.

Characters.—Hydrochlorate of apomorphine exists in the form of small, greyish-white, shining acicular crystals, which turn green on exposure to light and air, are inodorous, and possess a very faint acid reaction on moistened blue litmus paper. It is soluble in 7 parts of water and 50 parts of alcohol, and the solutions are decomposed with the production of a green colour when they are boiled.

Tests.—Bicarbonate of sodium throws down from solutions a precipitate which becomes green on standing, and then forms a purple solution with ether, violet with chloroform, and bluish-green with alcohol. With diluted solution of perchloride of iron it gives a deep red, and with nitric acid a blood-red colouration.

Preparation.—Injectio Apomorphinæ Hypodermica.

Therapeutics.—This salt has been found an efficient emetic in dogs, and is a most useful agent in cases of accidental poisoning where it is desired to produce vomiting. It exerts its effects specially on the vomiting centre.

Posology:—

Dog,	Hypodermically	... $\frac{1}{10}$ grain.
„	By the mouth	... $\frac{1}{5}$ grain.

AQUA.

Water.

This should be of the purest and best quality, and free from odour, unusual taste, or visible impurity. If necessary it should be cleared from all solid suspended, by means of filtration. In dispensing it is necessary to use pure water.

AQUA CAMPHORÆ.

Camphor Water.

Synonym.—Mistura Camphoræ.

Mode of Preparation.—Enclose $\frac{1}{2}$ ounce of camphor in a muslin bag, and attach this so that it may be kept at the bottom of a bottle containing the distilled water. Close the mouth of the bottle, macerate for at least two days, and then pour off the solution when it is required.

Preparations:—

Injectio Apomorphinæ Hypodermica.
Injectio Ergotini Hypodermica.
Liquor Atropinæ Sulphatis.

AQUA DESTILLATA.

Distilled Water.

Symbol.—H_2O.

Mode of Preparation.—Place 10 gallons of water in a copper still, connected with a block-tin worm. Reject the first half gallon, and preserve the next eight gallons.

Tests.—A fluid ounce when evaporated in a clean glass capsule should scarcely leave any visible residue. It should give no precipitates with sulphide of hydrogen, oxalate of ammonium, nitrate of silver, chloride of barium, solution of lime, or a mixture of starch mucilage and iodide of potassium, and only a faint colouration when a solution of potassio-mercuric iodide is added to 3 or 4 ounces.

AQUA PIMENTÆ.

Pimento Water.

Mode of Preparation.—Take of bruised pimento 14 ounces, and of water 2 gallons, and distil 1 gallon.

ARGENTI NITRAS.

Nitrate of Silver.

Synonym.—Lunar Caustic.

Symbol.—$AgNO_3$.

Mode of Preparation.—Add $2\frac{1}{2}$ fluid ounces of nitric acid, and 5 fluid ounces of distilled water, to 3 ounces of silver in a flask, and apply a gentle heat until the metal is dissolved. Pour off the clear liquor from any black powder which may be present. Evaporate and set it aside to crystallize. Again pour off the liquor, and set aside to crystallize. Let the crystals drain in a glass funnel, and dry them by exposure to the air, carefully avoiding the contact of all organic substances. If it is desired to have

the salt in rods, fuse the crystals in a capsule of platinum or thin porcelain, and pour the melted salt into proper moulds. Nitrate of silver should be preserved in bottles carefully stoppered, and kept away from the action of light, as, for instance, by being wrapped up.

Characters.—Nitrate of silver exists in the form of colourless tabular crystals, the primary form of which is the right rhombic prism. When moulded as above, it is in the form of white cylindrical rods. It is soluble in distilled water and in rectified spirit.

Tests.—With hydrochloric acid or a chloride solution of nitrate of silver, gives a curdy-white precipitate, which darkens by exposure to light, and is soluble in solution of ammonia.

A small portion heated on charcoal with the aid of the blowpipe first melts, and then deflagrates, leaving a dull white metallic coating.

A quantity weighing 10 grains dissolved in 2 fluid drachms of distilled water, gives with hydrochloric acid a precipitate of chloride of silver, which, when washed with hot distilled water and thoroughly dried, weighs 8·44 grains. The filtrate, when evaporated with a water bath, leaves no residue.

Action.—In large doses, nitrate of silver is irritant and corrosive, and acts as a stimulant on the spinal cord. In medicinal doses it is tonic, astringent, and stimulant. Externally it is a caustic, causing destruction with deep staining of the superficial layers, acute pain, inflammation of the deeper layers, separation of the part as a slough, and then rapid healing. It differs from potash in that its effects are limited to the area of application; and for general use it is thus the best caustic, and may be employed to destroy the affected part in bites by rabid dogs and venomous animals. When applied to the broken skin or a mucous membrane,

it has a similar action to salts of lead, but in a greater degree. It precipitates the albumens and chlorides of the plasma or discharge, coagulates the protoplasm of the young cells of the part, causes active contraction of the arteries, veins and capillaries, and rapidly coagulates the blood.

Uses.—Nitrate of silver is not much employed as an internal remedy in veterinary practice. In the dog it has been prescribed in chorea and epilepsy, and also in diarrhœa and dysentery. As an external application it is used extensively. Nitrate of silver is a very valuable local antiphlogistic for controlling the exudation, growth, and vascular irritation of the inflammatory process. It is very useful for touching indolent ulcers, and for applying to fungous growths and warts. A solution of 2 to 5 grains to the ounce of water, is serviceable in treating conjunctivitis. In treating opacities of the cornea, nitrate of silver proves very useful when such conditions are the result of accident. A weak watery solution of nitrate of silver is useful as a lotion for burns and scalds, alleviating pain in the early stages, and lessening the inflammation and discharge in the later stages.

In the treatment of vegetable parasitic diseases of the skin, nitrate of silver is sometimes employed as a lotion of the strength of 20 grains to the ounce of water. We, however, do not recommend it for this purpose, as many more efficient lotions and ointments are to be had. For mange, however, the lotion is more serviceable; but for this affection also, other applications are more suitable.

With the view of preventing the spread of erysipelas, a lotion of the same strength as the above mentioned is sometimes applied around the circumscribed part.

Posology:—

Horses and cattle ...	5 to 10 grains.
Dogs	$\frac{1}{8}$ to $\frac{1}{2}$ grain.

ARNICÆ RHIZOMA.

Arnica Rhizome.

Natural Order.—Compositæ.

Description.—The dried rhizome and rootlets of Arnica Montana. The rhizome is cylindrical, dark brown, from 1 to 2 inches or more long, and of the diameter of about $\frac{1}{6}$ to $\frac{1}{4}$ inch, contorted, rough from the scars of the fallen leaves (some remains of which are usually to be found at its upper end), and giving off from its under surface many dark brown, filiform wiry rootlets. The odour is peculiar and somewhat aromatic. The taste is acrid and slightly bitter.

Preparation.—Tinctura Arnicæ.

Therapeutics.—Arnica is one of those remedies which is more extensively employed in veterinary practice than its value in the treatment of internal and external disorders warrants. When applied externally, arnica increases the activity of the circulation in the skin. The tincture suitably diluted is much used for bruises, wounds, and sprains, with the object of preventing swelling and hastening the absorption of effused blood.

Internally, arnica is a stimulant to the alimentary canal, and has also alterative properties. In large doses it is a powerful irritant. In moderate doses it stimulates the heart and circulation in the brain and spinal cord. The tincture has been administered in several diseases in veterinary practice, more especially to animals recovering from debilitating diseases. In rheumatism it has no value when given internally.

Posology:—

Horse	... $\frac{1}{2}$ to 1 fluid ounce of the tincture.
Cattle	... 1 to 2 fluid ounces of the tincture.
Dogs	... 5 to 10 minims of the tincture.

ARSENII IODIDUM.

Iodide of Arsenium.

Synonyms.—Iodide of arsenic, arsenious iodide.

Formula.—AsI_3.

Mode of Preparation.—Iodide of arsenium is obtained by the direct combination of the two elements—iodine and arsenium, or by evaporating to dryness an aqueous mixture of arsenious and hydriodic acids.

Characters.—The salt exists in the form of small orange-coloured crystals, which are readily and almost entirely soluble in water and in rectified spirit.

Tests.—The aqueous solution is neither alkaline nor acid, and gives, like all solutions of compounds of arsenic, a yellow precipitate with sulphide of hydrogen. If heated in a test-tube, iodide of arsenic almost entirely volatilises, violet vapours of iodine being set free.

Preparation.—Liquor Arsenii et Hydrargyri Iodidi, the strength of which is about 1 grain in 100.

Therapeutics.—Iodide of arsenic is used in the preparation of Donovan's solution, or solution of iodide of arsenic and mercury.

ASAFŒTIDA.

Asafœtida.

Description.—Asafœtida is a gum-resin, obtained by incision from the living root of Ferula Narthex, Ferula Scorodosma, and probably other species. It exists rarely in tears, usually in irregular masses, which vary in consistence and in size, and are composed of tears agglutinated together by a material which is softer and more darkly coloured. The exposed surfaces of a piece which has been broken or cut have an amygdaloid appearance, and are at first opaque and milk-white, but change gradually to

purplish-pink or reddish-pink, and finally to a dull yellowish-brown colour. The taste is bitter, acrid, and onion-like. The odour is highly disagreeable, strong, characteristic, and alliaceous. When triturated with water, asafœtida forms a white emulsion.

Tests.—The freshly fractured surface of a tear when touched with nitric acid assumes for a short time a fine green colour.

Asafœtida should yield not more than 10 per cent. of ash.

It should be soluble to the extent of about 55 per cent. in rectified spirit.

Therapeutics.—Asafœtida has the stimulant action of other volatile oils and resins upon the alimentary canal. Although not much used in veterinary practice, it is not uncommonly prescribed as a stimulant and disinfectant expectorant in chronic cough in horses and cattle. Having some power in expelling flatulence and arresting muscular spasm, it is occasionally given in colic and tympanitis along with other remedies. In chorea in dogs it has no permanent effect.

Posology :—

Horses	...	... 3 to 4 drachms.
Cattle	...	... 1 to 2 ounces.
Sheep	...	... 1 to 1½ drachms.
Dogs	...	... 10 to 15 grains.

ATROPINA.

Atropine.

Formula.—$C_{17}H_{23}NO_3$.

Mode of Preparation.—This alkaloid is obtained from the dried root of Atropa Belladonna. It cannot be profitably prepared on a small scale. The chief parts of the process are the precipitation of acid colouring matter from a strong

tincture by means of lime, removal of the alcohol, addition of water and carbonate of potassium, taking up the alkaloid from the alkaline solution by chloroform, and subsequent purification.

Characters. — Atropine exists in colourless acicular crystals, which are sparingly soluble in water, but more readily in alcohol and in ether. It is an active poison.

Tests.—The aqueous solution has an alkaline reaction.

It gives a citron-yellow precipitate with perchloride of gold, has a bitter taste, and powerfully dilates the pupil.

It leaves no ash when burned with free access of air.

Preparations :—

Atropinæ Sulphas.
Atropinæ Unguentum.

Physiological Properties.—If a small dose of atropine be injected into the jugular vein of a dog, the cardiac and respiratory movements will be quickened, and the arterial blood-pressure will be raised.

The quickening of the heart's action is due to the paralysing of the cardiac inhibitory filaments of the vagi; the acceleration of the respiration is due to stimulation of the respiratory centre in the medulla; while the raising of the blood-pressure is due to contraction of the systemic arterioles, probably through the medium of the sympathetic.

Atropine has both a paralysing and a stimulant action on the spinal cord; but the former effect is greater than the latter.

In order to show the spinal stimulant action of atropine, animals whose respiratory muscles may be paralysed without causing death have been experimented upon. In the frog, a dose below the fatal minimum paralyses, firstly, the cutaneous sensory nerves, next the motor nerves and spinal cord. It does not impair idio-muscular contractility.

After the lapse of a variable number of hours or days, tetanic symptoms, not unlike those of strychnine-poisoning, are produced. These are due to the excitant action of the alkaloid on the spinal cord. This effect of atropine on the spinal cord was pointed out by Dr. Fraser, who has shown: (1) that in frogs tetanic symptoms follow the subcutaneous injection of a dose of sulphate of atropine equivalent to about 1,000th of the weight of the animal; (2) that this tetanus sometimes sets in on the second day, but more frequently on the third, fourth, or fifth; (3) that it varies in its duration from a few hours to seventeen days; (4) that it is due to the action of the drug on the cord (medulla oblongata and medulla spinalis). The afferent or sensory nerves are unaffected, or but little affected, by atropine. The accelerator nerve of the heart is probably stimulated by it.

Ringer thus summarises the probable effect of atropine:—

(1) It tetanises the cord, and heightens its reflex function.

(2) It stimulates the respiratory centre and the inhibitory centre of the heart.

(3) It stimulates the cardiac accelerator nerve or its centre.

(4) It stimulates the vaso-motor centre, and so heightens arterial pressure.

(5) It paralyses the motor nerves, first affecting the trunks.

(6) It paralyses the terminations of the vagi, both in the heart and lungs.

(7) It paralyses the terminations of the secretory nerves of the salivary glands, and perhaps those of the sweat glands.

(8) It paralyses the terminations of the inhibitory fibres of the splanchnics.

(9) Large doses slightly depress the functions of the afferent nerves.

(10) It paralyses the terminations of the oculo-motor nerves and stimulates the sympathetic, so far as the iris itself is concerned.

It appears, therefore, that whilst it acts as a stimulant to a large part of the central nervous system, to many of the nerves it operates as a paralyser.—(From Dr. Gresswell in the *Veterinary Journal.*)

Therapeutics.—Sulphate of atropine is the best form in which to use the alkaloid atropine.

ATROPINÆ SULPHAS.

Sulphate of Atropine.

Synonyms.—Atropiæ Sulphas, Sulphate of Atropia.

Mode of Preparation.—Mix 120 grains of atropine with 4 fluid drachms of water, and add a sufficient quantity of diluted sulphuric acid gradually, stirring them together until the alkaloid is dissolved and the solution is neutral. Evaporate to dryness at a temperature of 37·8° C.

Characters.—Sulphate of atropine is nearly colourless, crystalline, or pulverulent, soluble in water, forming a solution which is neutral to test-paper, and, when applied to the eye, dilates the pupil. It leaves no ash when burned with free access of air. Sulphate of atropine is a powerful poison, and is intended for external application.

Preparation.—Liquor Atropinæ Sulphatis, which contains 1 grain of the salt in 100 fluid grains of the solution.

Therapeutics.—Sulphate of atropine is a convenient form in which to employ belladonna. Recently it has been much used in veterinary practice for internal and external purposes.

Internally it has more especially been given by subcutaneous injection, but also by the mouth in the form of a ball or in solution.

Subcutaneously, sulphate of atropine is recommended by

Burness and Mavor for relieving pain in cases of colic, enteritis, gastro-enteritis, lumbago, sciatica, pleurisy, pleurodynia, spasm of the diaphragm, myalgia, etc. In these cases it may be given with morphine, in order to prolong the effects and to prevent the nausea so frequently caused by morphine when given alone in the canine and feline species. Atropine has also been given in cases of nephritis in the horse. In tetanus of the idiopathic and traumatic varieties, sulphate of atropine is said to have proved very efficacious, and by Burness and Mavor it is recommended in this disease to be given in conjunction with strychnine. Injected hypodermically it has been successfully administered in the treatment of garget in cows. For controlling cough, sulphate of atropine has as good effect, and in many cases externally a lotion of 2 to 4 grains of this alkaloidal salt to 1 ounce of water is effectual as a mydriatic. A few minims of this solution dropped into the conjunctival sac speedily dilate the pupillary opening. This solution is invaluable in cases of recurrent ophthalmia in horses, and in iritis in animals. As a mydriatic it is useful in dilating the pupil where it is desired to perform an operation on the eye, or to examine it for cataract. For relieving pain locally in animals, preparations of belladonna are generally preferred.

Posology :—

In solution or in the solid form by the mouth.

Horses and cattle	...	... $\frac{1}{2}$ to 1 grain.
Sheep	...	... $\frac{1}{10}$ grain.
Dogs	...	... $\frac{1}{40}$ to $\frac{1}{30}$ grain.

By hypodermic injection.—One-tenth of the above doses acts as efficiently if given subcutaneously.

Of the injectio atropinæ sulphatis hypodermica, which contains 4 grains to the ounce, the dose, for horses or cattle, is from 12 to 24 minims ($=\frac{1}{10}$ grain).

BALSAMUM PERUVIANUM.

Balsam of Peru.

Description.—This is a balsam exuded from the trunk of Myroxylon Pereiræ, after the bark has been beaten, scorched, and removed. It is a liquid somewhat less viscid than treacle, appearing nearly black in bulk, but in thin layers deep orange-brown, or reddish-brown and transparent. The odour is agreeably balsamic, more especially when the balsam is heated, and when swallowed it leaves a disagreeable burning sensation in the throat. It is insoluble in water, but soluble in chloroform or rectified spirit. The specific gravity is about 1·1435. Ten drops triturated with 6 grains of slaked lime produce a permanently soft mixture; and the mixture, on being warmed until all volatile matter is given off and until charring commences, gives no fatty odour. It should not diminish in volume when shaken with an equal bulk of water.

Therapeutics.—Balsam of Peru has the properties and actions of its components, benzoic acid and its allies, and resins. It is seldom employed in veterinary practice. In dogs it is very useful as an external application for mange, as it destroys the acarus, relieves the irritation and itching, and subdues the inflammatory action. The best method of applying it is to anoint the whole skin with a mixture of 1 or 2 drachms to 1 ounce of soft paraffin, after the dog has been thoroughly washed with soft soap and warm water. On the day following, the mixture may be washed off, and reapplied as before in a couple of days.

BALSAMUM TOLUTANUM.

Balsam of Tolu.

Description.—Balsam of Tolu exudes from the trunk of Myroxylon Toluifera, after incisions have been made in

the bark. When first imported, it is a soft and tenacious solid, but it becomes harder by keeping, and in cold weather is brittle like resin. In thin films it is transparent and of a yellowish-brown colour.

Tests.—When a minute portion is pressed between pieces of glass with the aid of heat, and then examined with a lens, an abundance of crystals of cinnamic acid is exhibited. The odour is highly fragrant, especially when the substance is warmed. The taste is somewhat aromatic and slightly acid. Balsam of tolu is soluble in rectified spirit, and the solution has an acid reaction.

Preparation.—Tinctura Benzoini Composita.

Therapeutics.—The action and uses of balsam of tolu are very similar to those of the preceding balsam. The syrup and the compound tincture of benzoin are sometimes prescribed for cough in dogs.

BELÆ FRUCTUS.

Bael Fruit.

Natural Order.—Aurantiaceæ.

Description.—Bael fruit is the fruit of Ægle Marmelos from Malabar and Coromandel, and should be dried when half-ripe. The fruit is roundish, and of about the size of a large orange, with a hard, woody, nearly smooth rind. As usually imported, it exists in dried more or less twisted slices, or in fragments consisting of portions of the rind and adherent dried pulp and seeds. The rind is about one-eighth of an inch thick, hard, and covered with a nearly smooth pale-brown or greyish firmly adherent epicarp. The pulp is firm and brittle, and of an orange-brown or cherry-red colour externally. When broken, it is seen to be nearly colourless internally. Bael fruit has no odour, and its taste is simply mucilaginous, and very slightly acid.

Preparation.—Extractum Belæ Liquidum.

Therapeutics.—Bael fruit has astringent properties, and is very useful in diarrhœa and dysentery in foals and calves. The drug is best administered as the liquid extract.

Posology.—Liquid extract of bael fruit.

Horses ...	... 2 to 4 fluid ounces.
Foals ...	... 1 to 2 fluid ounces.
Cattle ...	... 4 to 6 fluid ounces.
Calves ...	... 1 to 3 fluid ounces.

BELLADONNÆ FOLIA.

Belladonna Leaves.

Natural Order.—Atropaceæ.

Description.—The fresh leaves of Atropa Belladonna, separated from the branches and carefully dried. The leaves are gathered from plants growing wild or cultivated in England, when the fruit has begun to form. The leaves are alternate below, being in pairs above of unequal size. All are shortly stalked, from three to eight inches long, broadly ovate, acute, entire, and smooth. The expressed juice of the fresh leaves, or an infusion of the dried leaves dropped into the eye, dilates the pupil.

Preparations :—

Extractum Belladonnæ.
Succus Belladonnæ.
Tinctura Belladonnæ.
Unguentum Belladonnæ.

BELLADONNÆ RADIX.

Belladonna Root.

Natural Order.—Atropaceæ.

Description.—The root of Atropa Belladonna obtained from plants growing wild or cultivated in Britain, and

carefully dried, or imported in a dried state from Germany. Belladonna root exists in rough irregular branched pieces, from 1 to 2 feet long, and from $\frac{1}{2}$ an inch to 2 or more inches thick, generally marked at their upper end by the hollow bases of the stems which they once bore. The root is covered with a dirty grey or brownish integument, which is easily scraped off by the nail, when the exposed surface presents a whitish appearance. It breaks readily with a short fracture, and the surface is then seen to consist of a thin cortical portion of a yellowish or pale brown colour, separated by a dark line from a large central portion of a brownish colour, and marked throughout by scattered and more darkly coloured dots, but without evident medullary rays. An infusion dropped into the eye dilates the pupil.

Preparations:—

Atropina.

Extractum Belladonnæ Alcoholicum.

Linimentum Belladonnæ, 1 ounce to $1\frac{1}{2}$ fluid ounces.

Therapeutics. — Belladonna is extensively used in veterinary practice, internally and externally. In laryngitis in horses and cattle it is a most valuable remedy, as also it is in catarrh, bronchitis, and inflammation of the lungs. In some specific fevers, especially those in which the breathing organs are involved, such as influenza, strangles, purpura, and scarlet fever in horses, and distemper in dogs, it proves very beneficial. We have already reviewed many disorders in which the sulphate of atropine is administered. For these, belladonna is also suitable when a very rapid action is not an essential. In many painful disorders, belladonna has been frequently prescribed. In spasm of the diaphragm, spasmodic colic and asthma, it proves useful, and it assuages the pain of pleurisy and neuralgia, and is

commonly prescribed in rheumatism by some. In tetanus, belladonna is not of much value, nor has it proved of much benefit in nervous diseases, such as epilepsy and chorea. When the bowels are very sluggish, belladonna frequently restores tone to the lax involuntary muscle fibres of the walls of the intestines. For this purpose it may be administered with aperient remedies, either in solution or in the form of a ball. In inflammation of the udder in mares and cattle, belladonna is useful in relieving the pain, heat, and swelling. In this condition it is customary to prescribe full doses internally, and to apply the liniment of belladonna externally.

In inflamed conditions of the bladder or kidneys, belladonna is an esteemed remedy. Externally, belladonna has many uses. For the eye, however, it is preferable to employ a solution of sulphate of atropine (see Atropinæ Sulphas), as this alkaloidal salt is, from all points of view, so much more convenient for use than the preparations of belladonna itself. For lumbago and other painful or rheumatic affections, the liniment of belladonna is a good application. A very efficacious mixture may be made of equal parts of liniment of belladonna, and liniment of aconite. This mixture is a very good one for applying to the spine in cases of lockjaw. In garget or inflammation of the udder, the local application of the ointment or chloroform of belladonna proves very useful indeed.

Posology:—

Leaves.

Horses and cattle	... $1\frac{1}{2}$ to 2 ounces.

Extract.

Horses ...	... 1 to 2 drachms.
Cattle ...	... 2 to 3 drachms.
Sheep ...	... 20 to 30 grains.
Dogs ...	... 2 to 4 grains.

Posology (*continued*):

	Succus or Tincture.
Horses ...	... 1 ounce.
Cattle ...	... 2 ounces.
Dogs ...	... 5 to 15 minims.

BENZOINUM.

Benzoin.

Description.—Benzoin is a balsamic resin obtained from Styrax Benzoin, and probably other species of Styrax. It is generally procured by making deep incisions in the bark of the trees, and allowing the liquid which exudes to concrete by exposure to the air. It occurs in masses composed of loosely agglutinated tears, or more often of tears closely welded together by a deep amber-brown, reddish-brown, or greyish-brown translucent substance. The tears may be an inch or more in length. When first broken the surfaces exposed are opaque and milk-white. Sometimes the white substance is very small in amount, and the masses, when broken, resemble reddish-brown granite. Benzoin is very brittle, softens readily by the warmth of the mouth, and gives off, when heated, fumes of benzoic acid. The odour is agreeable and resembles vanilla, or, in some cases, storax. Benzoin has no taste. It is soluble in rectified spirit, and in solution of hydrate of potassium.

Preparations:—

Acidum Benzoicum.
Adeps Benzoatus (1 part to 50).
Tinctura Benzoini Composita.

Therapeutics.—Benzoin is slightly stimulating to the vessels. It has also expectorant, antiseptic, and disinfectant properties. It is sometimes used as Friar's balsam; externally

for wounds and sores, internally for chronic bronchitis or cough in dogs.

Posology.—Compound tincture of benzoin.

Dog ... ... ½ to 1 fluid drachm.

BISMUTHI ET AMMONII CITRAS.

Citrate of Bismuth and Ammonium.

Mode of Preparation.—Citrate of bismuth and ammonium is prepared from its solution by evaporating over a water-bath to the consistence of a syrup, and then spreading the thick fluid in thin layers on glass or porcelain plates, and drying at a temperature not exceeding 37·8° C. Remove the scales, and preserve them in a stoppered bottle.

Characters.—This salt occurs in the form of small, shining, translucent scales, which possess a slight metallic taste, and are very soluble in water.

Tests.—When warmed with a little fixed alkali the gas ammonia is evolved.

On ignition the salt chars, and yields a residue which is black, but with a yellow surface, and is soluble in a little nitric acid.

Preparation.—Liquor Bismuthi et Ammonii Citratis.

Therapeutics.—In view of the sedative and astringent action which the salts of bismuth have on the stomach, they are sometimes employed in the treatment of pain, due to catarrh or other organic disease of this organ in the dog. For this purpose the solution of bismuth and citrate of ammonium may be given in doses of ½ to 1 fluid drachm.

BORAX.

Borax.

Synonym.—Biborate of sodium.

Formula.—$Na_2B_4O_7,10H_2O$.

Description.—Borax is a salt which occurs as such in nature.

Mode of Preparation.—It can be prepared by boiling together in the correct proportions boric acid and carbonate of sodium.

Characters.—Borax occurs in transparent colourless crystals, sometimes slightly effloresced. It has a faint alkaline reaction, and is soluble in water but insoluble in rectified spirit.

Tests.—A hot saturated solution, when acidulated with any of the mineral acids, gives rise as it cools to a scaly crystalline deposit of boric acid. A solution of boric acid or a borate, when added to spirit, burns with a green flame.

Preparation.—Glycerinum Boracis.

Borax is used in the preparation of boric acid.

Therapeutics.—The action of borax is similar to that of boric acid. It has mild but efficient antiseptic and disinfectant properties, and is antacid. It is not much employed therapeutically. In aphthous and diphtheritic conditions of the mouth either the powder or the glycerine proves very useful as a dressing. As a lotion in itching skin affections borax proves very soothing. Internally borax has been given along with other remedies in cases of dyspepsia.

BROMUM.

Bromine.

Description.—Bromine is the only element, with the exception of mercury, which at ordinary temperatures is liquid. It is obtained from sea-water and some saline springs. It is a dark, brownish-red, very volatile liquid, possessing a strong and disagreeable odour. Its specific gravity is 3·055. At the average temperature of the air it gives off red vapours, and at about 60° C. it boils.

Test.—If agitated with solution of soda in such propor-

tion that the spirit remains very slightly alkaline, it forms a colourless liquid, which, if coloured by the addition of a little more bromine, should not become blue if a cold solution of starch be added.

Preparations:—

Acidum Hydrobromicum Dilutum.
Ammonii Bromidum.
Potassii Bromidum.
Sodii Bromidum.

CALCII CARBONAS.

Carbonate of Calcium.

Synonyms.—Creta Præparata, prepared chalk.

Description.—Chalk, freed from most of its impurities by elutriation, and afterwards dried in small generally conical masses. Chalk is a white amorphous substance.

Like all other carbonates, carbonate of calcium effervesces when acids are added, giving off carbonic acid gas, and dissolving with only a slight residue in diluted hydrochloric acid, forming chloride of calcium. If to this solution of chloride of calcium solution of ammonia and oxalate of ammonium are added, a copious white precipitate of oxalate of calcium is produced.

Preparation.—Hydrargyrum cum Creta (2 parts in 3).

Therapeutics.—Prepared chalk is used in the preparation of grey powder. As an internal remedy the succeeding preparation of precipitated carbonate of calcium is generally used. The uses and doses are the same.

CALCII CARBONAS PRÆCIPITATA.

Precipitated Carbonate of Calcium.

Mode of Preparation.—Dissolve 5 ounces of chloride of calcium in 2 pints of water. Also dissolve 13 ounces of

carbonate of sodium in 2 pints of water. Mix the two solutions, and allow the precipitate to subside. Collect it on a calico filter, wash it with boiling distilled water until the washings cease to give a precipitate with nitrate of silver, and dry the product at 100° C.

Characters.—It is a white crystalline powder, insoluble in water, but soluble with evolution of carbonic acid gas in hydrochloric acid and other acids.

Tests.—The solution in hydrochloric acid, when neutralised by ammonia, gives rise on the addition of oxalate of ammonium to a copious white precipitate. When diluted nitric acid is added to it, a clear solution is produced, which, if perfectly neutral and deprived of carbonic acid gas by boiling, is neither precipitated by saccharated solution of lime in excess, nor by solution of nitrate of silver.

Therapeutics.—Prepared chalk has antacid properties, and is often prescribed in cases of diarrhœa, dysentery, and indigestion with great benefit. In diarrhœa it may be combined with opium and catechu or opium and bael fruit, or, in diarrhœa in young stock, with bael fruit and camphor. In dysentery, it is best combined with ipecacuanha, bael fruit, and opium. In dyspepsia, a mild purgative should be given with it, and chloroform may be added.

It is also antidotic to poisoning by the oxalic, carbolic and mineral acids.

Posology :—

Horses	...	... 1 to 2 ounces.
Cattle	...	... 2 to 4 ounces.
Sheep	...	... 2 to 4 drachms.
Pigs	...	... 1 to 3 drachms.
Dogs	...	... 10 to 12 grains.

CALCII CHLORIDUM.

Chloride of Calcium.

Formula.—$CaCl_2,2H_2O$.

Mode of Preparation.—Chloride of calcium may be formed by neutralizing hydrochloric acid with carbonate of calcium, adding a little solution of chlorinated lime and slaked lime to the solution, filtering, evaporating until the chloride of calcium becomes solid, and finally drying it at about 204·4° C.

Characters.—Chloride of calcium exists in white agglutinated masses, which are dry, but very deliquescent.

Tests.—The salt evolves no chlorine or hypochlorous acid on the addition of hydrochloric acid.

It is entirely soluble in twice its weight of water, and also in alcohol.

An aqueous solution is not precipitated by the addition of lime-water.

Preparation.—Liquor Calcii Chloridi.

Therapeutics.—Chloride of calcium is sometimes prescribed in cases of scrofulous diseases of the glands, and for enlarged lymphatics. For such purposes the phosphate of lime, however, is often preferred.

Posology:—

Horses ...	... 20 grains to 30 grains.
Cattle ...	... 30 grains to 1 drachm.
Sheep ...	... 10 grains to 15 grains.
Dogs ...	... 1 to 5 grains.

CALCII HYDRAS.

Hydrate of Calcium.

Synonym.—Slaked lime.

Formula.—$Ca(HO)_2$.

Mode of Preparation.—Place 2 pounds of lime in a metal pot, and pour 1 pint of water upon it. When vapour ceases to be given off, cover the pot with its lid, and set it aside to cool. When the temperature has fallen to that of the air, put the slaked lime on an iron-wire sieve, and, by gentle agitation, cause the fine powder to pass through the sieve. Place the powder which passes through, rejecting what does not, into a well-stoppered bottle, and keep it excluded as much as possible from the air. Hydrate of calcium should be only used when it has recently been prepared, as it is very liable to absorb carbonic acid gas from the air, and be thus converted into carbonate of calcium.

Preparation.—Liquor Calcii Hydratis.

Therapeutics.—Hydrate of calcium, when applied externally, has a caustic action. With fused potash, it forms the so-called Vienna paste, or potassa cum calce. Internally, hydrate of calcium is used for its antacid properties, in virtue of which it proves useful in cases of indigestion, tympanitis, and hoven. Partly owing to this antacid property, partly to an obscure sedative effect on the intestinal glands which diminishes the excretion of water in the bowel, and partly to its physical action, it also acts as an astringent. As such it is given in cases of diarrhœa, for which it may be prescribed with opium or vegetable astringents. In the treatment of diarrhœa in young animals it is commonly added to the milk, in order to prevent the coagulating of the casein.

Lime is a valuable antidote for poisoning by the mineral acids and oxalic acid. As an enema, lime-water is useful in cases of ascarides in the lower part of the bowel.

Posology:—

Of Hydrate of Calcium.

Horses	...	... 1 drachm.
Cattle	...	... 1 to 2 drachms.
Sheep	...	... 20 to 30 grains.
Dogs	...	... 5 to 15 grains.

Of Lime-water, or Solution of Hydrate of Calcium.

Horses	...	... 4 fluid ounces.
Cattle	...	... 6 fluid ounces.
Sheep and dogs		... 2 fluid drachms to 1 fluid ounce.

CALCII OXIDUM.

Oxide of Calcium.

Synonym.—Lime.

Mode of Preparation.—Oxide of calcium is obtained by heating chalk or limestone, so as to expel carbonic acid gas.

Description.—Lime exists in compact masses of a whitish colour. It readily absorbs water, and, when rather less than its weight of water is added, a piece swells and falls into powder, becoming very hot.

Tests.—The powder thus formed, when agitated with distilled water, gives, after filtration, a clear solution possessing an alkaline reaction, and yielding a white precipitate with oxalate of ammonium. The powder obtained by slaking also dissolves, without much residue, in diluted hydrochloric acid.

Preparation.—Calcii Hydras.

Therapeutics.—Unslaked lime, when applied to raw surfaces, has irritant, desiccant, and caustic properties.

It is used in the preparation of the hydrate of calcium.

CALCII PHOSPHAS.

Phosphate of Calcium.

Formula.—$Ca_3(PO_4)_2$.

Mode of Preparation.—Take of

Bone Ash, 4 ounces.
Hydrochloric Acid, 6 fluid ounces.
Water, 2 pints.
Solution of Ammonia, 12 fluid ounces, or a sufficient quantity.
Distilled Water, a sufficient quantity.

Digest the bone-ash in the hydrochloric acid, diluted with a pint of water, until it is dissolved. Boil for a few minutes, filter, add the remainder of the water and the solution of ammonia, until the mixture acquires an alkaline reaction. Collect the precipitate on a calico filter, and wash it with boiling distilled water as long as the liquid which passes through occasions a precipitate when dropped into solution of nitrate of silver acidulated with nitric acid. Dry the washed product at a temperature not exceeding 100° C.

Characters. — Phosphate of calcium is a light white amorphous powder, insoluble in water, but soluble in diluted nitric acid.

Tests.—The solution in nitric acid continues clear when a diluted solution of acetate of sodium is added in excess.

On the addition, however, of a little oxalate of ammonium or of perchloride of iron to the solution in nitric acid, a white precipitate is formed.

The solution in nitric acid is only rendered slightly turbid by solution of nitrate of silver.

Preparation.—Pulvis Antimonialis.

Therapeutics.—Phosphate of lime is given in cases of rickets in young badly nourished animals, and also in cases of scrofulous disease of the glands and joints. It has

also proved useful in cases of chronic diarrhœa in young beasts and sheep, more especially with iron salts or vegetable tonics.

Posology :—

Horses and cattle	... 1 to 3 drachms.
Sheep and dogs ...	... 5 to 10 grains.

CALCII SULPHIDUM.

Sulphide of Calcium.

Synonym.—Calx Sulphurata.

Mode of Preparation.—Mix thoroughly 7 ounces of sulphate of calcium in fine powder with 1 ounce of wood charcoal also in fine powder. Heat the mixture to redness in an earthen crucible until the black colour has disappeared. Cool, and at once place the whitish residue in a stoppered bottle.

Characters.—Sulphide of calcium should contain at least 50 per cent. of pure sulphide of calcium (CaS). As above prepared it is a nearly white powder, with a smell like that of sulphide of hydrogen.

Therapeutics.—Sulphide of lime is very rarely given in veterinary practice.

It is recommended in doses of ½ to 1 drachm in cases of purpura hæmorrhagica in horses.

CALUMBÆ RADIX.

Calumba Root.

Natural Order.—Menispermaceæ.

Description.—Calumba root as spoken of in pharmacy exists in irregular, flattish, circular or somewhat oval dried slices, which have been cut transversely from the root of Jateorhiza Calumba. The slices are from about an inch to 2 inches or more in diameter, and from one-eighth to half an inch or more in thickness. The cortical portion is thick,

covered by a wrinkled and irregular brownish-yellow coat, and separated from the central portion, which is concave on both surfaces, by a fine dark-coloured line. The pieces have a greyish or greenish-yellow colour, a slight odour, and bitter taste. The pieces break readily and suddenly with a mealy fracture, and are easily powdered. The appearance of calumba root is very characteristic, and it can be detected almost at a glance.

Preparation.—Tinctura Calumbæ ($2\frac{1}{2}$ ounces to 1 pint).

Therapeutics.—Calumba root is stomachic, bitter, and tonic. The powder is given to cattle and horses, and the extract is a useful basis for making pills for dogs. The tincture is a convenient form for prescribing cordial and tonic draughts for horses.

Posology:—

Horses	...	... $\frac{1}{2}$ to 1 ounce.
Cattle	...	... 1 to 2 ounces.
Sheep	...	... 1 to 3 drachms.
Pigs	...	... $\frac{1}{2}$ to 1 drachm.
Dogs	...	... 5 to 20 grains.

CALX CHLORINATA.

Chlorinated Lime.

Description.—Chlorinated lime is obtained by exposing slaked lime to the action of chlorine gas as long as it is absorbed. It may be regarded as consisting of the hypochlorite and the chloride of calcium ($CaCl_2O_2$,$CaCl_2$), or as a direct compound of chlorine and lime.

Characters.—Chlorinated lime is a dull white powder with an odour of chlorine. It is partly soluble in water.

Tests.—An aqueous solution gives off chlorine copiously upon the addition of oxalic acid, and deposits at the same time oxalate of calcium.

Preparations :—

Liquor Calcis Chlorinatæ (2 ounces to 1 pint of water).

Chlorinated Lime is used in preparing Chloroform and Vapor Chlori.

Therapeutics.—Chlorinated lime is rarely given internally. Its action, when taken, is astringent, stimulant, and alterative, and it is antidotic to poisoning by sulphuretted hydrogen.

Externally applied, it has feeble antiseptic and marked deodorizing powers. The liquor is therefore valuable as a dressing for foul-smelling wounds and abscesses, and it has also been used as a local application for grease.

The special use, however, of chlorinated lime, is that which it possesses in virtue of its disinfectant and deodorant properties. It owes these properties partly to the readiness with which it evolves free chlorine and hypochlorous acid, and partly to the free lime it contains. With this view it is often prescribed in the later stages of tympanitis in cattle and sheep.

As a ready method of disinfecting stables contaminated with the germs of infectious diseases, the powder or a solution will serve equally well. When it is desired to evolve chlorine more rapidly, it is customary to add sulphuric acid to a quantity of the powder placed in an earthenware pot or dish.

Posology :—

Horses	...	... 1 drachm.
Cattle	...	... 1 to 2 drachms.
Sheep	...	... ½ drachm.
Dogs	...	... 1 to 3 grains.

CAMBOGIA.

Gamboge.

Natural Order.—Guttiferæ.

Description.—Gamboge is a gum-resin obtained from Garcinia Hanburii. As used in commerce it occurs in cylindrical solid or hollow rolls, which are longitudinally striated on the surface, and either distinct or more or less agglutinated, forming masses. It breaks with a conchoidal fracture, and the surfaces exposed are opaque, smooth, glistening, and of a uniform reddish-yellow colour. When powdered, a bright yellow colour is presented. There is no odour, but the taste is very acrid. When rubbed with water, a yellow emulsion is formed, which is used as a paint in water-colour painting.

Tests.—Gamboge is completely dissolved by the successive action of rectified spirit and water.

An emulsion made with boiling water, and cooled, does not become green with solution of iodine.

Therapeutics.—Gamboge is a hydragogue cathartic resembling colocynth, but not possessing the property of the latter as a direct cholagogue. It has also a diuretic effect. Gamboge is not given in equine or canine practice, its effect on horses and dogs being too violent and drastic. In ruminants, however, it is administered along with other purgative ingredients, more especially with sulphate of sodium or sulphate of magnesium. It possesses the advantage, when given with about half the usual dose of either of these saline purges, of having a rapid action.

Posology :—

Cattle ...	... ½ to 1 ounce.
Sheep ...	... 15 to 30 grains.

CAMPHORA.

Camphor.

Natural Order.—Lauraceæ.

Description.—Camphor is a stearoptene obtained from the wood of Cinnamomum Camphora. It is imported in the crude state, and is purified by sublimation. It occurs in solid crystalline masses, which are colourless or whitish and translucent. Numerous fissures are presented by large masses. Camphor is somewhat tough, but it is readily powdered if moistened with rectified spirit, ether, or chloroform. The odour is powerful, penetrating, and characteristic. The taste is pungent and somewhat bitter, and is followed by a sensation of cold. Camphor is lighter than water, and therefore floats upon it. It burns readily with a bright smoky flame, which may be utilized for blackening paper for tracings. Even at the ordinary temperature of the air it volatilizes somewhat rapidly, and when heated it sublimes entirely. It is readily soluble in rectified spirit, ether, or chloroform, very slightly in water.

Preparations:—

Linimentum Aconiti.
Linimentum Belladonnæ.
Linimentum Camphoræ.
Linimentum Camphoræ Compositum.
Linimentum Chloroformi.
Linimentum Hydrargyri.
Linimentum Opii.
Linimentum Saponis.
Linimentum Sinapis Compositum.
Linimentum Terebinthinæ.
Linimentum Terebinthinæ Aceticum.
Spiritus Camphoræ.
Tinctura Camphoræ Composita.

Therapeutics.—Externally, camphor is stimulating to the local circulation, sedative to the nerves after temporary stimulation, and it is also slightly antiseptic. Internally, it has carminative, stimulant, diaphoretic, and antiseptic properties. It is also anodyne and feebly diuretic. Owing to its being excreted by the respiratory organs, on which it acts like turpentine, it is given with other expectorants. Externally, applications containing camphor are used for allaying pain in articular rheumatism, and for diminishing irritability in some skin affections. As an internal remedy, camphor is given in cough and spasmodic affections. In diarrhœa also it is much esteemed. Camphor is given with other remedies, rarely or never being administered alone.

In the treatment of diarrhœa, it may be conjoined with opium, chalk, vegetable astringents, and aromatics. With bael fruit and opium a useful mixture for this purpose is formed, to which a small quantity of diluted nitro-hydrochloric acid may be added. For relieving chronic cough, camphor may be given with belladonna and opium. In cases of influenza in horses, it is often prescribed with carbonate of ammonium, and this combination has a very good effect. One drachm of camphor, with 2 drachms of carbonate of ammonium, and half an ounce of spirit of chloroform, may be given in water twice or three times daily.

Posology :—

Horses ...	... 1 to 2 drachms.
Cattle ...	... 1 to 2 drachms.
Sheep and pigs	... 20 to 30 grains.
Dogs ...	... 5 to 10 grains.

CANNABIS INDICA.

Indian Hemp.

Natural Order.—Cannabinaceæ.

Description.—The dried flowering or fruiting tops of the female plants of Cannabis Sativa, from which the resin has not been removed. The plant is grown in India, where it is known as Gunjah or Ganga. Indian hemp consists of small more or less aggregated masses, from about $1\frac{1}{2}$ to $2\frac{1}{2}$ inches in length. The tops of one or more alternate branches bear the remains of the flowers and smaller leaves with a few ripe fruits, all pressed together by resinous matter. It may be composed of straight stiff woody stems several inches long, surrounded by the branched flower-stalks. It is rough to the touch, very brittle, of a dusky-green colour, with scarcely any taste. The odour is faint, peculiar, and narcotic.

Preparations :—

Extractum Cannabis Indicæ.

Tinctura Cannabis Indicæ (22 grains of extract in 1 fluid ounce, nearly).

Therapeutics.—Indian hemp is a soporific, anodyne, and antispasmodic. It has similar properties to opium, and has been given in the treatment of tetanus in horses, along with other remedies. In tetanus it appears to be beneficial in relieving the spasms, but it probably is not of much efficacy in this disease. Cannabis Indica is one of the ingredients in chloroform, and is thus largely used in veterinary practice for colic, inflammation of the bowels, and other diseases. In irritative fever, consequent upon wounds in connection with joints, it has a very favourable action. The extract is also sometimes added to cough balls for horses. In chorea in dogs, the tincture or the extract is useful in allaying the spasms.

Posology :—

Tincture of Cannabis Indica.

Horses	...	... 1 to 2 ounces.
Dogs	...	... 15 to 30 minims.

Extract of Cannabis Indica.

Horses	...	... 1 to 2 drachms.
Dogs	...	... ½ to 1 grain.

CANTHARIDES.

Cantharides.

Natural Order.—Coleoptera.

Description.—The beetle, Cantharis vesicatoria, is about ¾ inch to 1 inch long, and ¼ inch broad. It has two long elytra or wing-sheaths of a shining coppery-green colour, under which are two thin brownish transparent membranous wings. The odour is strong and disagreeable. The powder is greyish-brown, containing shining green particles.

Preparations :—

Acetum Cantharidum (2 ounces to 1 pint).
Tinctura Cantharidum.
Tinctura Cantharidum Fortis.
Unguentum Cantharidum.
Unguentum Cantharidum Compositum.

Therapeutics.—Cantharides act as a rubefacient and vesicant when applied externally. The effects upon the nerves and vessels resemble those of mustard, but, while they are much less rapid, they are nevertheless more severe. For most purposes fly-blister is one selected for general purposes of counter-irritation. Blisters are especially employed for controlling inflammation, promoting the absorption of morbid products, and allaying pain. In acute

pleurisy, the application of a cantharides-blister is used in the early stages in order to arrest the inflammatory action and to abate the pain, and also in the stage of effusion to promote absorption of fluid. In pleurodynia, in acute bronchitis and subacute pneumonia, and in encephalitis, it is also ordered. In relieving the pain of acute articular rheumatism it is likewise serviceable in abating the suffering, and it is also used in cases of chronic rheumatism. In phlebitis the application of a cantharides blister proves very beneficent. In the treatment of enteritis and colic cantharides are not indicated, the application of the hot pack or a mustard-poultice having a more prompt and valuable action. For abscesses, where it is desired to promote suppuration; for inflamed conditions of bursæ, ligaments, tendons, joints and bones, where a smart blister is requisite, nothing acts better than cantharides.

Internally cantharides irritate the mouth and stomach. Cantharidin, the active principle, enters the blood from the stomach, as also it does from a blistered surface. Small doses are diuretic. Large doses inflame the kidneys, and cause irritation of the genital organs. It thus acts as an aphrodisiac, but is not to be recommended for the purpose. In small doses cantharides are occasionally effectual in wasting diseases of horses and cattle due to functional derangement of the stomach, but care should be used in the employment of this drug.

Posology:—

Horses ...	... 3 to 6 grains.
Cattle ...	... 5 to 10 grains.
Sheep and pigs	... 1 to 3 grains.
Dogs ...	... ½ to 2 grains.

CAPSICI FRUCTUS.

Capsicum Fruit.

Natural Order.—Solanaceæ.

Description.—The dried ripe fruit of Capsicum fastigiatum is from about ½ to ¾ inch long and ¼ inch in diameter. It is somewhat shrivelled, oblong-conical, obtuse, and composed of a smooth, shining, brittle, thin, translucent pericarp; dull orange-red in colour, enclosing several small roundish or ovoid flat seeds. The taste of both pericarp and seeds is intensely pungent, and the odour is peculiar and pungent.

Preparation.—Tinctura Capsici (16½ grains to 1 fluid ounce).

Therapeutics.—Capsicum is a pungent stomachic, carminative, and stimulant, and is prescribed along with other tonics for debility, and also for increasing the appetite, and in cases of tympanitis to dispel flatulency.

Posology:—

Horses	...	... 10 to 20 grains.
Cattle	...	... 20 to 40 grains.
Sheep	...	... 5 to 10 grains.
Dogs	...	... 1 to 2 grains.

CARBO ANIMALIS.

Animal Charcoal.

Description.—The residue of bones which have been exposed to a red heat without the access of air. Animal charcoal consists principally of carbon, and phosphate and carbonate of calcium.

CARBO LIGNI.

Wood Charcoal.

Description.—When wood is charred by exposure to a red heat, in the absence of air, wood charcoal is produced.

Wood charcoal occurs in black, brittle, porous, easily powdered masses, without taste or smell. It is very light. and has the form and texture of the wood from which it was prepared. When burned at a high temperature, with free access of air, it should leave not more than about 2 per cent. of ash.

Preparation.—Cataplasma Carbonis.

Therapeutics.—Charcoal is a deodorant and disinfectant. It absorbs and condenses many gases, as oxygen, ammonia, hydrogen sulphide, carbonic acid ; and thus it is that it deprives foul emanations of their smell. It is not volatile, and thus it is not so valuable as sulphurous acid or chlorine as a disinfectant and deodorant. In the form of a poultice, or as a powder, it is useful in promoting a more healthy action in foul ulcers and unhealthy discharging surfaces.

When taken internally, charcoal absorbs gases in the stomach and checks fermentation, and thus it acts as a carminative in flatulence and dyspepsia. In the intestines likewise it absorbs gases, and, diminishing peristaltic action, is sometimes prescribed in diarrhœa. Charcoal, not being absorbed, has no specific action on the constitution. Animal charcoal is used as an antidote in cases of poisoning by opium, nux vomica and aconite, with the alkaloids of which it combines, rendering them inert. In order to be effectual it must be administered before the poison has had time to be absorbed. It has also been given in cases of poisoning by arsenic and hydrocyanic acid.

Posology :—

Horses	...	... $\frac{1}{4}$ to 1 ounce.
Cattle	...	... $\frac{1}{2}$ to 1 ounce.
Sheep	...	... 1 to 3 drachms.
Pigs	...	... 1 to 2 drachms.
Dogs	...	... 15 to 40 grains.

CARDAMOMI SEMINA.

Cardamom Seeds.

Natural Order.—Zingiberaceæ.

Description.—Cardamom seeds are the dried ripe seeds of the Malabar Cardamom, Elettaria Cardamomum. It is best to keep the seeds in their pericarps until they are required for use, when the pericarps must be rejected. The seeds are about $\frac{1}{6}$th inch long, irregularly angular, transversely wrinkled, dark reddish-brown externally, whitish within. The odour is aromatic, and the taste warm and very aromatic. The pericarps in which the seeds are enclosed vary from about $\frac{2}{5}$ths inch to nearly 1 inch long, and from about $\frac{1}{5}$th to $\frac{2}{5}$ths inch broad. They are ovoid or oblong, obtusely triangular, shortly beaked, rounded at the base, brownish-yellow, longitudinally striated, tasteless and odourless.

Preparation.—Tinctura Cardamomi Composita.

Therapeutics.—Cardamoms are rarely given in veterinary practice. They have a carminative action allied to that of the peppers, and may be administered in the same doses as aniseeds, coriander and fenugreek. The tincture is a convenient form in which to prescribe them in dogs.

CARYOPHYLLUM.

Clove.

Natural Order.—Myrtaceæ.

Description.—Cloves are the dried flower-buds of Eugenia caryophyllata. They are about half an inch long, and

consist of a dark-brown, wrinkled, sub-cylindrical, and somewhat angular calyx-tube, which tapers below, and is surmounted by four teeth, between which the paler petals, enclosing the numerous stamens and style, are rolled up in the form of a ball. The odour is strong, fragrant, and spicy. The taste is very pungent and aromatic. Cloves contain *caryophylline*, and when indented with the nail emit oil.

Preparation.—Oleum Caryophylli.

Therapeutics.—Oil of cloves is one of the aromatic volatile oils, and resembles turpentine in its action. It has stomachic, carminative, stimulant, anti-spasmodic and corrective properties.

In veterinary practice it is sometimes given with purgatives to prevent griping. Likewise it is given in colic in horses. Half a drachm to 40 minims is the dose of the oil for a horse, and 1 to 3 minims for a dog.

CASCARILLÆ CORTEX.

Cascarilla Bark.

Natural Order.—Euphorbiaceæ.

Description.—The dried bark of Croton Eluteria exists in quills, from 1 to 3 or more inches in length, and from $\frac{1}{6}$ to $\frac{1}{2}$ inch in diameter.

The bark is covered with a dull brown, easily separable, corky layer, which is more or less coated with a silvery or greyish-white lichen. The fracture is brown, short, and resinous. The taste is warm and nauseously bitter. The odour is agreeably aromatic, more especially when warmed.

Therapeutics.—Cascarilla is an aromatic bitter stomachic.

It is a useful adjunct to tonic remedies, prescribed for debility, or in convalescence from disease. The powder may

be used, or the tincture, or infusion. For dogs, the tincture is a useful preparation.

Posology:—

Horses ...	... 3 to 4 drachms.
Cattle ...	... 1 ounce.
Sheep and pigs	... 1 to 2 drachms.
Dogs ...	... 10 to 40 grains.

CATAPLASMA CARBONIS.

Charcoal Poultice.

Mode of Preparation.—Take of

Wood Charcoal in powder, ½ ounce;
Linseed Meal, 3½ ounces;
Boiling Water, 10 fluid ounces.

Add the linseed meal to the boiling water. Stir well and then add half the charcoal, and finally sprinkle the rest of the charcoal on the surface of the poultice.

CATAPLASMA FURFURIS.

Bran Poultice.

Mode of Preparation.—Take of

Bran, 3 parts;
Linseed Meal, 1 part;
Boiling Water, a sufficient quantity.

Mix the meal and the bran well together, and then add the boiling water, constantly and thoroughly stirring it.

Use.—Bran poultice causes slight relaxation of the vessels of the part to which it is applied, thereby allaying pain and inflammation.

CATAPLASMA LINI.

Linseed Poultice.

Mode of Preparation.—Take of
Linseed Meal, 2 parts;
Boiling Water, 5 fluid parts.

Gradually stir the two together, taking care that they are thoroughly mixed.

CATAPLASMA SINAPIS.

Mode of Preparation.—Take of
Mustard in powder, 2½ ounces;
Linseed Meal, 2½ ounces;
Boiling Water, } of each a sufficient quantity.
Water, }

Mix the mustard with 3 ounces of lukewarm water, and the linseed with about 7 ounces of boiling water. Mix and stir thoroughly. Boiling water, if added to mustard directly, would prevent the formation of the vesicating substance, sulphocyanide of allyl.

CATAPLASMA SODÆ CHLORINATÆ.

Chlorine Poultice.

Mode of Preparation.—Take of
Solution of Chlorinated Soda, 1 fluid part;
Linseed Meal, 2 parts;
Boiling Water, 4 fluid parts.

Mix the linseed meal gradually with the boiling water, and add the solution of chlorinated soda, constantly stirring.

CATECHU.

Catechu.

Natural Order.—Cinchonaceæ.

Description.—Catechu is an extract of the leaves and young shoots of Uncaria Gambier. It occurs in cubes or masses which vary in size, and are formed of more or less agglutinated cubes. The separate cubes are in extent about 1 cubic inch, deep reddish-brown externally, pale cinnamon-brown internally, dry, breaking readily with a dull earthy fracture. The microscope reveals myriads of very small acicular crystals. The taste is at first bitter and very astringent, but subsequently sweetish. There is no odour. Catechu is entirely soluble in boiling water. The decoction, when cool, should not be rendered blue by iodine.

Preparations :—

Infusum Catechu (16 grains to 1 fluid ounce).
Tinctura Catechu (54½ grains to 1 fluid ounce).

Therapeutics.—Catechu has a very similar action to tannic acid, and it is prescribed internally for the same disorders. In diarrhœa it is especially useful, being usually combined with opium and ginger and chalk, or carbonate of magnesia.

Catechu is very seldom employed for external purposes, but is sometimes applied as an astringent to ulcers slow in healing.

Posology :—

Horses ...	... 1 to 3 drachms.
Cattle ...	... 2 to 6 drachms.
Calves ...	... 1 drachm.
Sheep and pigs	... 1 to 2 drachms.
Dogs ...	... 5 to 15 grains.

CERA FLAVA.

Yellow Wax.

Description.—Yellow wax is prepared from the honeycomb of the hive bee, Apis mellifica. It is firm, and breaks with a granular fracture. The colour is yellow, and the odour honey-like. It is not unctuous to the touch. It should be readily and entirely soluble in hot oil of turpentine. It should not yield more than 3 per cent. to cold rectified spirit, and nothing to water or to a boiling solution of hydrate of sodium.

These two fluids, after being mixed with yellow wax and then filtered, should neither be turbid nor give a precipitate with hydrochloric acid. The specific gravity is about 0·96. Yellow wax melts at 63·3° C. In order to prove this, liquefy a few grains, and draw up a little of the fluid into a capillary tube. Fix a piece of the filled capillary tube to the bulb of a thermometer by thread; and then immerse the bulb and tube in a beaker of water, and heat the water gently. At the moment when the opaque wax becomes transparent, note the temperature as indicated by the attached thermometer. The solidifying point is about $2\frac{1}{2}$ degrees lower than the melting point. Boiling water in which yellow wax has been agitated is not, when cooled, rendered blue by iodine.

Therapeutics.—Wax is used to increase the consistence of ointments.

One part of yellow wax to four of benzoated lard, or to two or three parts of oil, will make an ointment of suitable consistency.

Wax is rarely administered internally, but has been given to allay irritability in diarrhœa.

CETACEUM.

Spermaceti.

Description.—Spermaceti is a concrete fatty substance, which, mixed with oil, is obtained from the head of the Sperm Whale, Physeter macrocephalus. It is separated from the oil by filtration and pressure, and is afterwards purified. Spermaceti is crystalline, pearly-white, glistening, translucent, with little taste or odour. It can be reduced to powder by the addition of a little rectified spirit. It is insoluble in water, but soluble in ether, chloroform, or boiling rectified spirit. It is but slightly unctuous to the touch. The melting point is about 46° to 95° C., and it can be tested as described in the case of yellow wax.

Preparation.—Unguentum Cetacei.

Therapeutics.—Spermaceti is used in the preparation of plasters and ointments.

CHIRATA.

Chiretta.

Natural Order.—Gentianaceæ.

Description.—The entire dried plant, Ophelia Chirata; collected in Northern India, where the fruit begins to form.

The *root* is about $2\frac{1}{2}$ inches long, and usually unbranched.

The *stem* is 3 feet or more long, rounded below, and above slightly quadrangular, branched dichotomously, smooth, and orange-brown or purplish. Except at the lower part, the stem consists of a thin woody ring, enclosing a large and continuous and easily separable yellow pith.

The *leaves* are ovate, with 5 to 7 ribs.

The *flowers* are small, numerous, and panicled.

Chiretta has no odour, but every part of the plant has a very bitter taste.

Therapeutics.—Chiretta is an aromatic bitter, having the

same properties as gentian. It is seldom given in veterinary practice. Of the tincture and infusion the dose is the same as of those of gentian.

CHLORALIS HYDRAS.

Hydrate of Chloral.

Symbol.—C_2HCl_3O,H_2O.

Mode of Preparation.—Chloral is an oily liquid which is produced by the action of dry chlorine gas on anhydrous alcohol.* It is purified by means of distillation, first from sulphuric acid, and afterwards from a small quantity of lime. It is finally converted into hydrate of chloral by the addition of water.

Characters.—Hydrate of chloral exists in the form of whitish or colourless crystals, which do not deliquesce on exposure to air. It has a pungent but not an acrid odour, and a bitter taste. If heated gently, hydrate of chloral fuses, forming a colourless transparent liquid, which, as it cools, begins to solidify at about 48·9°C. When introduced into a test-tube together with pieces of broken glass, it boils at about 95·5°C., and at a slightly higher temperature it volatilizes on platinum foil without residue. Hydrate of chloral is soluble in less than its own weight of distilled water, rectified spirit, or ether, and in four times its weight of chloroform.

Tests.—An aqueous solution is neutral or but slightly acid to test-paper.

A solution in chloroform, when agitated with sulphuric acid, does not become coloured.

Preparation.—Syrupus Chloralis (10 grains in 1 fluid drachm).

Action.—When administered in medium doses, chloral hydrate causes sleep. This is said to be partly owing to its

* The reaction may be thus represented :—

$$C_2H_6O + 4Cl_2 = 5HCl + C_2HCl_3O.$$

direct action on the nervous structure of the brain, and partly to the anæmia which soon succeeds the temporary congestion induced in this organ. Our own opinion leads us to attribute the soporific effects of chloral more especially to the former of the two above causes, and rather also to congestion of the central organ of the nervous system than to anæmia; since in cases where small animals have been killed after several rather large doses of chloral, the cerebral structures appeared rather congested than anæmic. Large doses of chloral induce profound sleep, which passes into coma. The number of the pulse-beats is reduced by this drug, or they are rendered very weak and rapid, and the temperature of the animal falls.

At first the pupils contract, and afterwards dilate. It is, however, not always possible to detect any contraction when the drug is administered in medicinal doses.

Chloral hydrate induces great muscular relaxation, and after poisonous doses the animal dies from arrest of respiration or paralysis of the heart. Some physiologists maintain that chloral produces hyperæsthesia, but this is denied by others. In large doses, at any rate, anæsthesia is caused. The paralysis and loss of reflex action seem to be due to the direct action of the agent upon the cord itself, for the motor nerves and muscles themselves are not affected by it. Moreover, in a chloralized animal direct irritation of the spinal cord produces less active contraction than in animals not under the influence of chloral.

The blood-pressure is markedly lowered by large doses of chloral; the heart is weakened, and in poisonous doses is arrested in diastole. The frequency of the breathing is diminished, owing to the action of the drug on the respiratory centre in the medulla oblongata.

Uses.—Being a powerful hypnotic, indeed probably the most powerful in this respect of all medicinal agents, chloral

hydrate is administered to soothe the cerebral hemispheres, allay excitement and irritability, and induce sleep. Chloral hydrate is administered in a large variety of diseases among animals, and it is also employed externally to allay irritability.

In nervous spasmodic affections, such as chorea, and epilepsy, in asthma and paroxysmal coughing, bronchitis, and spasmodic colic, chloral hydrate is frequently given. In tetanus in horses it alleviates the spasms, and it acts as a valuable adjuvant in the treatment of this dread malady. It is also given alone in this disease, but its beneficial action is much enhanced by giving nicotine or tobacco at the same time. It is given as a hypodermic injection in the treatment of tetanus, or by the mouth. In puerperal convulsions, in parturient apoplexy, encephalitis, and hydrophobia, it is administered with benefit, and is recommended by Dun in muco-enteritis in cart-horses. As an antidote to strychnine poisoning chloral hydrate is the most efficacious of remedies. It is also antidotic to physostigmine.

Externally chloral allays irritability of the skin. One part in twelve of water may be used for this purpose.

Posology :—

Horses...	...	... 3 to 6 drachms.
Cattle ...	...	... 1 to 1½ ounces.
Sheep and pigs	...	... 1 to 2 drachms.
Dogs ...	...	... 10 to 20 grains.

When administered hypodermically half of the above doses will suffice.

CHLOROFORM.

Chloroform.

Symbol.—$CHCl_3$.

Mode of Preparation.—Chloroform is prepared by distilling alcohol with chlorinated lime and slaked lime, wash-

ing the distillate with sulphuric acid, and redistilling from slaked lime and chloride of calcium. The alcohol probably first becomes reduced to aldehyde. From the aldehyde, chloral is formed, and this is broken up by the caustic lime into formate of calcium and chloroform.

Characters.—Chloroform is a limpid colourless liquid, of an agreeable ethereal odour, and sweet taste. It dissolves in alcohol and ether in all proportions, and in water to the extent of one volume to two hundred. The specific gravity is 1·497. It should not be coloured by agitation with sulphuric acid, and after evaporation should leave no residue and no unpleasant odour.

Preparation.—Spiritus Chloroformi.

Therapeutics.—When applied externally chloroform has a local anæsthetic effect, depressing the terminations of the sensory nerves and causing a sense of coldness. It thus reduces sensibility and allays pain.

As a general anæsthetic, chloroform, administered in the form of vapour mixed with air, is par excellence the agent to be employed for inducing insensibility in horses. For dogs chloroform is not so suitable, as, even when care is taken in its administration, a fatal result has sometimes followed its inhalation. A mixture of one part of chloroform and two of ether is preferable for dogs, and may be employed with safety when the necessary precautions are taken.

Chloroform, when administered by inhalation, at first powerfully stimulates the nervous system. The cerebral hemispheres are first aroused, and the muscular centres are likewise acted upon, and severe struggles are often made. The medulla oblongata is then acted upon, the circulatory and respiratory centres in the floor of the fourth ventricle being stimulated. The number of the pulse and of the respirations is increased, and the blood-pressure is augmented. Then follows the stage of depression. Sensation is lost, pain is

not felt, the function of the same structures being diminished. Reflex excitability is first diminished, and then lost. The number of the pulse falls and the beats lose force, while the respiratory movements become slower and stertorous. When administered carefully, there is not the slightest risk attending the inhalation of chloroform in healthy horses. It is necessary, however, to feel the pulse at regular intervals, owing to the effect the agent has in reducing the blood-pressure. Mr. D. Gresswell used chloroform for many years in almost all serious operations on the horse, and never saw any ill effects attending or following its administration. From 2 to 4 ounces of chloroform is generally effectual in producing anæsthesia in horses and cattle. For horses, 2 ounces of the agent may be poured in the nosebag, which may then be adjusted. An amount of 1 ounce, followed by half-ounce doses, may then be added at intervals, as may be necessary. In some cases it is found that 6 ounces are not too much to render anæsthesia complete. In the dog and cat it is best not to allow food for three or four hours prior to administering chloroform. It is best given to the smaller animals on a piece of lint or sponge held near the nostrils. If chloroform be given after the second stage, or stage of depression terminating in complete anæsthesia, there is great danger of death from loss of all reflex excitability of the cord and medulla. The respiratory centre loses its irritability and breathing ceases, while from failure of the cardiac centre, the heart stops in diastole, and the blood-pressure falls. Death results either from failure of the heart, or respiratory mechanism, or both. It is in the second stage, which is generally induced in four or five minutes, that the operator performs his work. There is no danger in maintaining this condition for an hour to an hour and a half, provided that due supervision is not neglected. If the pulse shows any sign of failing, or the breathing

becomes slow or shallow, the administration of chloroform should be suspended. Cold water should be dashed upon the head, the tongue drawn forward out of the mouth, and artificial respiration must be resorted to.

Besides being used for causing anæsthesia for painful operations in animals, chloroform is advised in the case of malpresentations in the mare when the animal cannot otherwise be quieted. Similarly in bitches, cows, and ewes, this agent has been inhaled to relax the rigid os uteri (Dun). In the reduction of hernia it is likewise sometimes indicated.

As an inhalation in tetanus, chloroform has not a permanent beneficial effect.

Chloroform, when administered by the mouth, acts as a carminative in dispelling flatulence and easing pain in dyspepsia and colic, and is frequently given as an antispasmodic and sedative. It has also some power as an antiseptic in arresting the development of fungoid growths in vegetable infusions. In epilepsy and chorea in dogs, it may be given by the mouth, or may be inhaled. In enteritis and peritonitis, it is given in horses to ease the acute agony. In these maladies it is perhaps best given by the mouth, and may be advantageously combined with opium or tincture of aconite. In acute rheumatism, asthma and spasmodic coughing, it likewise is often given with benefit. In cases of spasmodic colic, a draught of 1 drachm of chloroform and $1\frac{1}{2}$ ounces of laudanum, with an ounce of tincture of pimento, is a useful mixture.

As an external application, chloroform is not largely used in veterinary practice, ether being more efficacious as a local anæsthetic. When applied locally with extract of belladonna, or aconite, or opium, or other anodyne, chloroform is useful in abating local pains of a neuralgic or rheumatic character.

Posology :—

As a general anæsthetic.

Horses	... 3 to 6 ounces.
Cattle ...	... 3 to 6 ounces.
Sheep and pigs	... 2 ounces.
Dogs ...	... 4 drachms to 1 ounce.

As an internal remedy.

Horses	... 1 to 2 drachms.
Cattle ...	... 1 to 2 drachms.
Sheep and pigs	... 20 to 40 minims.
Dogs ...	... 3 to 6 minims.

CHRYSAROBINUM.

Chrysarobin.

Natural Order.—Leguminosæ.

Synonyms.—Araroba Powder, Goa Powder.

Description.—Chrysarobin is the medullary matter of the stem and branches of Andira Araroba, dried and powdered. It contains more or less chrysophanic acid according to age and condition, and yields much of it by oxidation. When purified by solvents it is a light brownish-yellow, minutely crystalline powder, which is tasteless and odourless. It is very sparingly soluble in water, but almost entirely soluble in 150 parts of hot rectified spirit. When heated it melts, and partially sublimes in yellow vapours, leaving a charred residue which entirely disappears on ignition in air. It dissolves in sulphuric acid, forming a yellowish or reddish solution, and in solution of hydrate of potassium, forming likewise a yellowish or reddish solution, which is fluorescent and becomes carmine-coloured by absorption of oxygen from the air.

Preparation.—Unguentum Chrysarobini.

Therapeutics. — Chrysarobin stimulates the skin and

destroys vegetable growths upon it. It is therefore used in the form of ointment in ringworm and in scaly affections of the skin, such as psoriasis and pityriasis.

CINCHONÆ CORTEX.

Cinchona Bark.

The above name is given to the dried bark of Cinchona Calisaya, Cinchona officinalis, Cinchona succirubra, Cinchona lancifolia, and other species of Cinchona. From the barks of these, various most valuable alkaloids can be obtained. Salts of quinine and cinchonine may also be obtained from some species of Remijia.

Preparations:—

Cinchonidinæ Sulphas.
Cinchoninæ Sulphas.
Quininæ Sulphas.

Therapeutics and Posology.—See next drug.

CINCHONÆ RUBRÆ CORTEX.

Red Cinchona Bark.

Description.—Red cinchona bark is the dried bark of the stem and branches of cultivated plants of Cinchona succirubra. It exists in quills or more or less incurved pieces, coated with what is called the periderm. It may be a few inches or more than a foot in length. The bark itself is from about one-tenth to one-fourth inch thick, or rarely more. The outer surface is more or less rough from longitudinal furrows and ridges, or transverse cracks, annular fissures and warts. It is reddish-brown or brownish in colour. The inner surface is brick-red or deep reddish-brown, irregularly and coarsely striated. The fracture is

rather close in the smaller quills, but finely fibrous in the larger ones. When it is pulverized, the powder is brownish or reddish-brown. There is no marked odour. The taste is bitter and slightly astringent. The bark should yield about 5½ per cent. of alkaloids in all, of which not less than half shall consist of quinine and cinchonidine.

Preparations :—

Extractum Cinchonæ Liquidum (about 1 ounce to 1 fluid ounce).

Infusum Cinchonæ Acidum (22 grains to 1 fluid ounce).

Tinctura Cinchonæ (88 grains to 1 fluid ounce).

Therapeutics.—The physiological action of the cinchona barks will be discussed under quinine, the most important alkaloid. Cinchona bark, owing to its being much cheaper than its alkaloidal salts, is more extensively employed in animal than human practice. It has tonic, antipyretic, antiperiodic, and antiseptic properties. In debility, anæmia, and recovery from exhausting diseases, cinchona bark is largely given, and may advantageously be combined with diluted hydrochloric or diluted nitro-hydrochloric acid. On account of its antipyretic property, the bark is given for reducing the temperature in fever; but for this purpose, one of its alkaloidal salts is usually preferred, more especially in horses and dogs. When the temperature is very high, salicylate of sodium is often more suitable, as being more rapid in action. On account of its antiseptic properties, the bark is given in strangles, scarlet fever, purpura hæmorrhagica, and pyæmia in horses. On account of its antiperiodic action, it is given in ague, malarial fever, and recurrent ophthalmia in horses. For dogs, the liquid extract of cinchona is an admirable preparation; but the sulphate of quinine is still better adapted, as cinchonine

may cause vomiting in them. In chorea in dogs, the bark or its liquid extract, or the sulphate of quinine, is beneficial from its antiperiodic action.

Posology :—

Horses ...	... 2 to 5 drachms.
Cattle ...	... 1 to 2 ounces.
Sheep and swine	... 1 to 3 drachms.
Dogs ...	... 20 grains to 1 drachm.

CINCHONIDINÆ SULPHAS.

Sulphate of Cinchonidine.

Formula.—$(C_{20}H_{24}N_2O)_2,H_2SO_4,3H_2O$.

Mode of Preparation.—Sulphate of cinchonidine is the sulphate of an alkaloid, cinchonidine, existing in the bark of various species of Cinchona. The salt may be obtained from the mother-liquors of the crystallization of sulphate of quinine by further concentration, and purified by crystallization from alcohol, and finally from hot water.

Characters.—It exists in colourless silky crystals which are usually acicular. It is soluble in water, alcohol, or ether, almost insoluble in chloroform or in solution of ammonia, and readily soluble in diluted acids.

Tests.—An aqueous solution has a bitter taste and a neutral or faintly alkaline reaction, turns a ray of polarized light to the left, and when acidified is not distinctly fluorescent. Like all other sulphates, sulphate of cinchonidine gives a white precipitate with solution of chloride of barium. An aqueous solution also yields a white precipitate with solution of potassio-tartrate of sodium. Sulphate of cinchonidine dissolves in pure sulphuric acid to form a faintly yellow solution, which undergoes no apparent change when gently warmed. When the salt is ignited in the air no ash remains.

Therapeutics.—Sulphate of cinchonidine may be given for the same maladies, and in the same doses, as sulphate of quinine, for which it is often substituted in treating animals, as it is nearly if not quite as efficacious.

CINCHONINÆ SULPHAS.

Sulphate of Cinchonine.

Formula.—$(C_{20}H_{24}N_2O)_2,H_2SO_4,2H_2O$.

Description.—Sulphate of cinchonine is the sulphate of an alkaloid contained in the bark of various species of Cinchona and Remijia.

Mode of Preparation.—The sulphate of cinchonine may be obtained from the mother-liquors of the crystallisation of the sulphates of quinine, cinchonidine, and quinidine, by precipitating the alkaloid with caustic soda, washing it with spirit until it is free from other alkaloids, dissolving in sulphuric acid, and, after purifying the solution with animal charcoal, allowing to crystallise.

Characters.—Sulphate of cinchonine exists in the form of hard, colourless, short prismatic crystals which possess a vitreous lustre.

Tests.—It is soluble in water and in chloroform, and readily in rectified spirit and in diluted acids; almost insoluble in ether and in solution of hydrate of ammonium. An aqueous solution has a bitter taste, a neutral or faintly alkaline reaction, and turns a ray of polarised light to the right. When acidified, the solution is not fluorescent. Like all sulphates, it gives a white precipitate with chloride of barium. It is soluble in pure sulphuric acid without change of colour, and the solution undergoes no apparent alteration when gently warmed. When it is ignited in air, no ash remains.

Therapeutics.—The sulphate of cinchonine is often

substituted for quinine in veterinary practice, being much cheaper. The medicinal properties and dose are the same. Being more nauseous, it is not suitable for dogs.

CINNAMOMI CORTEX.

Cinnamon Bark.

Natural Order.—Lauraceæ.

Description.—Cinnamon bark is the dried inner bark of shoots from the truncated stocks or stools of the cultivated cinnamon tree, Cinnamomum zeylanicum. It is imported from Ceylon, and hence known in commerce as Ceylon Cinnamon. Cinnamon bark occurs in closely rolled quills, which are about three-eighths of an inch in diameter, and contain several smaller quills. It is thin, brittle, splintery, moderately pliable, dull light yellowish-brown externally, and marked by little scars or holes and faint shining wavy lines. It is of a darker brown colour on the inner surface. The odour is fragrant, the taste warm, sweet, very agreeable and aromatic. It is used to impart a fragrant and very pleasant taste.

Tests. — A decoction when cool is not coloured by iodine.

Therapeutics.—Cinnamon has a similar action, and is used for the same purposes, as other aromatics. It contains tannic acid, and is therefore also astringent. It is seldom used in veterinary practice, but is an ingredient of several of the British pharmacopœial preparations.

COCA.

Coca.

Natural Order.—Erythroxylaceæ.

Description.—The leaves of Erythroxylon Coca should be dried for use. They are shortly stalked oval, or

lanceolate leaves, of varying thickness, 1 to 2 inches or more in length, entire, usually blunt and emarginate, green above, somewhat paler beneath, and quite smooth. The midrib is prominent, and from it run numerous faint, freely anastomosing lateral veins. On each side of the midrib a curved line extends from the base to the apex of the leaf. As a rule the leaves sold are more or less broken, and frequently yellowish-green, yellowish-brown, or brown, and sometimes, though rarely, the curved lines are indistinguishable. The odour is faintly tea-like, and is especially marked when the leaves are bruised. The taste is somewhat bitter and aromatic.

Preparation.—Cocainæ Hydrochloras.

Therapeutics.—An infusion of the leaves has been given in the convalescent stages of influenza in horses, and as a general tonic after debilitating diseases. The dose is *ad libitum.*

COCAINÆ HYDROCHLORAS.

Hydrochlorate of Cocaine.

Formula.—$C_{17}H_{21}NO_4$,HCl.

Description.—Hydrochlorate of cocaine is the salt of an alkaloid obtained from the leaves of Erythroxylon Coca.

Mode of Preparation.—To obtain it, ether is agitated with an aqueous solution of an acidulated aqueous extract, made alkaline with carbonate of sodium. The ethereal liquid is separated and evaporated, and the product is purified by treating it as before with acidulated water, carbonate of sodium, and ether; decolouring, and finally neutralising with hydrochloric acid, and recrystallising.

Characters.—Hydrochlorate of cocaine exists in the form of nearly colourless acicular crystals, or as a crystalline powder.

Tests.—It is readily soluble in water, alcohol, and ether. An aqueous solution has a bitter taste, gives a yellow precipitate with chloride of gold, and a white precipitate with carbonate of ammonium, soluble in excess of the reagent. When applied to the tongue an aqueous solution produces a tingling sensation, followed by numbness. An aqueous solution likewise dilates the pupil of the eye. The salt dissolves in cold concentrated acids, forming solutions devoid of colour. On the other hand, strong sulphuric acid chars it. The aqueous solution yields little or no cloudiness with chloride of barium, or oxalate of ammonium. Ignited in the air it burns without residue.

Preparation.—Lamellæ Cocainæ.

Therapeutics. — Coca leaves are not much used in veterinary practice, but the salts of cocaine are now proving of great value as local anæsthetics for producing insensibility in operations on the eyes and other parts. The physiological action of coca and its alkaloid is thus summed up by Dr. Bennet: (1) in small doses, not ending fatally, cocaine causes partial loss of sensibility; (2) in doses which are subsequently fatal it produces, prior to death, general loss of sensibility; (3) it destroys the excitability of the posterior columns of the cord, and paralyses the entire system of the peripheral sensory nerves; but the anterior columns and the peripheral motor nerves remain intact; (4) it induces spontaneous convulsions; but, unlike those induced by strychnine, they are not excited by peripheral irritation, owing to paralysis of the sensory nerves; (5) special experiments proved that the nerve-endings in the skin and mucous membranes were rendered inexcitable, apart from any action the drug had upon the nerve-centres. Cocaine is a mydriatic; it slightly raises the temperature and quickens the pulse and respiration. A few drops of a 2 to 4 per cent. solution, when placed upon the cornea,

produce insensibility after the lapse of a few minutes. Similar effects are produced on the throat, ear, mouth, larynx, trachea, urethra, rectum, and tongue. Cut surfaces and open sores are similarly rendered not sensitive.

For the eye an aqueous solution of hydrochlorate of cocaine of the strength of 2 to 4 per cent. of the alkaloid is employed, while a 4 to 20 per cent. solution may be used for other parts. Of the weak solutions it is necessary to repeat the application at intervals of three to five minutes or so. The effect begins in about three minutes, increases from ten to twenty minutes, and generally disappears within half an hour.

For operations on the eyes of horses and dogs this new local anæsthetic is already proving of immense value. In entropium, ectropium, and pterygium, as well as in wounds of the eyelid, it may be employed. In extracting foreign bodies from the eye we have found it of great service in horses, and it is also recommended to be applied before puncturing the cornea for the filaria oculi.

COCCUS.

Cochineal.

Class.—Insecta. **Order.**—Hemiptera.

Description.—The female insect Coccus Cacti, reared on Opuntia cochinillifera and on other species of Opuntia, dried. The insect is about one-fifth of an inch in length, somewhat oval in outline, flat or concave beneath, convex above, transversely wrinkled, purplish-black or purplish-grey in colour, and easily reduced to a dark red or puce-coloured powder. When macerated in water no insoluble powder is separated. If ignited with free access of air, not much more than 1 per cent. of ash remains.

Preparation.—Tinctura Cardamomi Composita (55 grains to 1 pint).

Use. — Cochineal is a colouring material, sometimes employed in veterinary practice.

COLCHICI CORMUS.

Colchicum Corm.

Natural Order.—Melanthaceæ.

Description.—The fresh corm of the plant, Colchicum Autumnale, collected about the end of June or the beginning of July; and the same stripped of its coats, sliced transversely, and dried at a temperature not exceeding 65·5° C. The fresh corm is about one inch and a half long and an inch broad, somewhat conical, flattened on one side when there is a new corm in process of development, and rounded on the other. It is covered with an outer thin brown membranous coat, and an inner reddish-yellow one. Internally the corm is white and solid, and, when it is cut, it yields a milky juice of a bitter taste and disagreeable odour. The dried slices are about one-eighth or one-tenth of an inch thick, yellowish at their circumference, indented on one side and convex on the other, so that the shape is reniform. The surfaces are firm, white, and amylaceous. The pieces break readily with a short fracture. The taste is bitter, but there is no odour.

Preparation.—Vinum Colchici.

Therapeutics and Posology. — Same as those of the seeds.

COLCHICI SEMINA.

Colchicum Seeds.

Natural Order.—Melanthaceæ.

Description.—The seeds of the plant Colchicum Autumnale, collected when fully ripe—that is, generally about

the end of July or beginning of August. The seeds, which should be carefully dried, are about the size of white mustard-seed—that is, about one-tenth of an inch in diameter—sub-globular in shape, slightly pitted, reddish-brown, somewhat rough, very hard and difficult to powder. They possess no odour, but have a bitter and acrid taste.

Preparation.—Tinctura Colchici Seminum.

Therapeutics.—Colchicum is a gastro-intestinal irritant and cholagogue. Its active principle, colchicine, affects chiefly the central nervous system, large doses causing loss of sensibility and consciousness, and diminishing reflex excitability. The respiratory centre is depressed in activity, death occurring through asphyxia. The heart's action also is weakened. Perspiration is induced and the kidneys become congested, the amount of urine being diminished, while the solid constituents are probably increased.

Colchicum, in the form of tincture, was given by Mr. D. Gresswell in lymphangitis in horses with great benefit. In chronic rheumatism and rheumatic affections it is of great value. In periodic ophthalmia in horses it is a remedy not to be despised.

Posology:—

Of the corm or powdered seed.

Horses ...	... ½ to 1 drachm.
Cattle ...	... 1 to 2 drachms.
Sheep ...	... 10 to 25 grains.
Dogs and pigs	... 2 to 5 grains.

The tincture is the preparation to be preferred. To the horse it may be given in half-ounce doses.

COLLODIUM.

Collodion.

Mode of Preparation.—Mix 36 fluid ounces of ether, and 12 fluid ounces of rectified spirit, and add 1 ounce of pyroxylin. Set the mixture aside for a few days, and if there is any sediment found, decant the clear solution. Preserve the collodion in a well-corked bottle.

Characters.—Collodion is a colourless highly inflammable liquid. It possesses an ethereal odour, and it dries rapidly on exposure to the air, leaving a thin transparent film, which is insoluble in water or rectified spirit.

Preparation.—Collodium Flexile.

Uses.—Collodion is sometimes used to form a covering over slight wounds, causing their edges to adhere together. The ether evaporates, and after several applications with a brush, the film becomes thick enough for the purpose.

COLLODIUM FLEXILE.

Flexible Collodion.

Mode of Preparation.—Mix together 12 fluid ounces of collodion, $\frac{1}{2}$ ounce of Canada balsam, and $\frac{1}{4}$ ounce of castor oil. Preserve the flexible collodion which is formed in a well-corked bottle.

Uses.—Flexible collodion gives a more strong support to wounds than the preceding preparation.

COLOCYNTHIDIS PULPA.

Colocynth Pulp.

Natural Order.—Cucurbitaceæ.

Description.—Colocynth pulp consists of the dried peeled fruit, freed from seeds, of Citrullus Colocynthis. As imported, colocynth pulp usually presents the appearance of

fragments of broken balls. It is whitish, very light, spongy, and tough. The broken-up pulp freed from seeds should alone be used. The pulp possesses no odour, but the taste is intensely bitter.

Test.—The powder should not be coloured blue by iodine. If it is treated with ether and then the ether is evaporated, no oil should be left.

Therapeutics.—Colocynth acts as a hydragogue purgative, but is seldom employed in veterinary practice. The extract has been given in dog practice.

CONFECTIO ROSÆ GALLICÆ.

Confection of Roses.

Natural Order.—Rosaceæ.

Mode of Preparation.—Beat 1 pound of fresh red-rose petals to a pulp in a stone mortar, add 3 pounds of sugar, and rub the rose-pulp and the sugar well together.

Therapeutics.—The confection of roses is sometimes used in the preparation of dog-pills, for which purpose it is well adapted.

CONII FOLIA.

Hemlock Leaves.

Natural Order.—Umbelliferæ.

Description.—The fresh leaves and young branches of Conium maculatum, gathered from wild British plants when the fruit begins to form. The leaves are more or less divided in a pinnate manner. The lower leaves are decompound and sometimes 2 feet in length, glabrous, and arising from a smooth stem, which is marked with dark purple spots, and by clasping petioles of varying lengths, those of the lower leaves being hollow. The odour is strong and very disagreeable, more especially when the leaves are rubbed with solution of hydrate of potassium.

Preparations:—

Extractum Conii.
Succus Conii.

Action and Posology.—See next drug.

CONII FRUCTUS.

Hemlock Fruit.

Natural Order.—Umbelliferæ.

Description.—The fruit of the plant Conium maculatum, gathered when fully developed, but while still green, and carefully dried. The fruit is about one-eighth of an inch long, broadly ovoid, somewhat compressed laterally, and crowned by the depressed stylopod. In colour the fruit is dull greenish-grey. As generally met with, the mericarps are separated. Each mericarp presents five prominent more or less crenated ridges, with the furrows smooth and without evident vittæ. If reduced to powder and rubbed with solution of hydrate of potassium, the fruit gives out a very strong and disagreeable odour.

Preparation.—Tinctura Conii.

Action.—The experiments and observations of Paul Guttmann on rabbits show that conium causes gradual paralysis of the voluntary muscles, and then of the muscles of respiration. The paralysis first begins in the extremities, then affects the anterior muscles and those of the trunk, and lastly those of respiration. This paralysis is not due to the action of the drug upon the muscles themselves, for it has been shown that the irritability of muscles, through which blood poisoned with conine has been permitted to flow, is as great as that of muscles of the same animal protected from the action of the poisoned blood by ligation of the blood-vessels. Nor does conium paralyse by its effect on the cord itself, for if a limb is protected from the influence of the

poisoned blood by ligation of both its artery and vein, and the animal (frog) is thus poisoned and thoroughly paralysed by conium, the ligatured limb can still manifest powerful movements. Conium thus acts on the nerves, and it has been shown by Guttmann that it affects the periphery of the motor nerves earlier than the trunk. The sensory nerves are not affected, and thus conine paralyses solely by its action on the motor nerves. Dr. Harley's investigations lead him to the conclusion that conium is a depressant of the motor tract of the cord, and of the motor ganglia of the brain. There is much difference of opinion as to its action on the heart.

Uses.—Conium is useful in spasmodic affections of a nervous character, such as chorea and epilepsy, and also in spasmodic cough. In tetanus in horses, it has had a thorough trial, but its efficacy in this disease is but temporary, and it has consequently almost ceased to be prescribed for this malady. In recurrent ophthalmia, conium is said to act well in abating the pain, and in this disease it is advantageously combined with cinchona bark or its alkaloids. Likewise, conium is sometimes prescribed in neuralgic affections.

Externally it is sometimes used to abate pain in rheumatism, especially of the muscular variety.

Posology :—

Tincture.

Horses ...	... 2 ounces.
Cattle ...	... 3 ounces.
Dogs ...	... 1 to 2 drachms.

Succus.

Horses ...	... 2 to 3 ounces.
Cattle ...	... 3 to 4 ounces.
Sheep and pigs	... ½ to 1½ ounces.
Dogs ...	... 1 to 1½ drachms.

Posology (*continued*):

	Extract.
Horses ...	... 1 drachm.
Cattle ...	... 2 drachms.
Dogs ...	... 1 to 4 grains.

The succus is the most reliable of the preparations of conium.

COPAIBA.

Copaiba.

Natural Order.—Leguminosæ.

Description.—Copaiba is the oleo-resin obtained by cutting deeply or boring into the trunk of Copaifera Langsdorffii and other species of Copaifera. It is a more or less viscid liquid, generally transparent and not fluorescent. Some varieties are opalescent, and occasionally slightly fluorescent. The colour may vary from light yellow to pale golden-brown. Copaiba has a peculiar aromatic odour which is very characteristic, and a persistent acrid, somewhat bitter taste. The average specific gravity of copaiba is 0·9665, but it varies slightly. If a small quantity is heated until all volatile oil is removed, a residue is left, which when cold is hard, and generally easily rubbed to powder. The oil volatilised during the operation does not smell of turpentine. Copaiba is almost entirely soluble in absolute alcohol, and in four times its bulk of petroleum spirit. In the latter case, a filmy deposit is left on standing.

Preparation.—Oleum Copaibæ.

Therapeutics.—Copaiba is excreted by the kidneys, and being carried on with the urine, it has a stimulant and disinfectant action on the whole genito-urinary tract. The mucous secretion of the bronchi is increased, and the drug then acts as an expectorant. It is also diuretic. Copaiba is prescribed in animals after the first stage of gonorrhœa is over.

Posology:—Horses and cattle ... 1 to 2 ounces.

CREASOTUM.

Creasote.

Description.—Creasote, a product of the distillation of wood tar, is a liquid, colourless or with a yellowish tinge. It possesses a strong empyreumatic odour. It is sparingly dissolved by water, but freely by alcohol, ether, and glacial acetic acid. The specific gravity is 1·071.

Tests.—Creasote does not coagulate albumen.

If it is dropped on a white filtering paper and exposed to a temperature of 100° C., no translucent stain is left.

It turns the plane of polarisation of a ray of polarised light to the right.

It is not solidified by the cold produced by a mixture of hydrochloric acid and sulphate of sodium.

It is miscible with collodion without production of any precipitate.

A 1 per cent. aqueous solution, with a drop of diluted neutral solution of ferric chloride, attains a green colour which rapidly changes to a reddish-brown; and, unless the mixture is very much diluted, a reddish-brown precipitate is produced.

Preparations :—

Unguentum Creasoti (1 part in 9).
Vapor Creasoti.

Therapeutics.—The action of creasote is very similar to that of carbolic acid, which has now largely supplanted it for internal and external purposes. The vapor of creasote inhaled in chronic bronchitis and disease of the lungs has a beneficial action. Taken internally, creasote has been given in farcy in horses, and as an addition to mixtures for diarrhœa. Externally, it is employed in some skin diseases, more especially those of an animal parasitic nature. In

scabies or mange, the ointment proves destructive to the acarus. In psoriasis also it has proved of some benefit.

In combination with other remedies it has been successfully given in cases of chronic cough, and also as a tonic.

Posology :—

Horses	...	... 15 to 30 minims.
Cattle	...	... 20 to 40 minims.
Sheep	...	... 10 to 15 minims.
Pigs	...	... 5 to 10 minims.
Dogs	...	... 1 to 2 minims.

CUBEBA.

Cubebs.

Natural Order.—Piperaceæ.

Description.—The dried unripe full-grown fruit of Piper Cubeba is globular, about one-sixth of an inch in diameter, black or brown in colour, greatly wrinkled. Below, the fruit tapers into a round thin stalk, continuous with, and firmly attached to, the pericarp. Beneath the shrivelled skin is a hard brown smooth shell, in which the seed is contained in the fruit, if mature, but in commercial specimens the seed is generally so slightly developed that the pericarp is nearly empty. The taste is warm, aromatic, and somewhat bitter. The odour is peculiar.

Test.—A decoction, when cold, is coloured bright indigo-blue by solution of iodine.

Preparation.—Tinctura Cubebæ ($2\frac{1}{2}$ oz. to 1 pint).

Therapeutics.—The action of cubebs is stomachic and carminative in small doses. In large doses it is a gastro-intestinal irritant. In its action cubebs closely resembles copaiba, stimulating and disinfecting the genito-urinary passages and promoting expectoration. It is prescribed in veterinary practice in gonorrhœa, chronic bladder

affections, and sometimes as an aromatic in indigestion and loss of appetite, and also in chronic bronchitis.

Posology :—

Horses ...	... 2 to 4 drachms.
Cattle ...	... 4 drachms to 1 ounce.
Sheep and pigs	... 30 grains to 2 drachms.
Dogs ...	... 30 grains to 1 drachm.

CUPRI SULPHAS.

Sulphate of Copper.

Formula.—$CuSO_4,5H_2O$.

Mode of Preparation.—Sulphate of copper may be obtained by heating sulphuric acid and copper together, dissolving the soluble product in hot water, and evaporating the solution until crystallisation takes place on cooling, or by dissolving black oxide of copper in hot diluted sulphuric acid, filtering, evaporating, and crystallising.

Characters.—Sulphate of copper is a blue salt, and occurs in oblique prismatic crystals, which are soluble in water, forming a pale-blue solution, which strongly reddens litmus.

Tests.—An aqueous solution, being that of a sulphate, gives with chloride of barium a white precipitate insoluble in hydrochloric acid. With ferrocyanide of potassium a maroon-red precipitate is produced.

If an aqueous solution of the salt be mixed with twice its volume of solution of chlorine, and solution of ammonia be added, the precipitate which is first formed by the ammonia will be dissolved by a further sufficient addition of it, and a violet-blue solution will be produced, leaving little or nothing undissolved.

Therapeutics.—Internally sulphate of copper is astringent, tonic, and antiseptic. In cats and dogs it acts as a direct

emetic. Externally it acts as a caustic, stimulant, and astringent. In diarrhœa and dysentery sulphate of copper in small doses is often prescribed along with opium and vegetable astringents. It is also given in melœna, and in horses as an anthelmintic, followed by a full dose of aloes. As an emetic it is suitable when the stomach is to be rapidly evacuated of its contents. In nervous affections, such as chorea, it has been used with advantage in dogs. Sulphate of copper is best given soon after a meal, but its administration cannot be long tolerated. Sulphate of copper is applied locally in solution as an antiseptic and caustic for foot rot, sinuous channels, and protuberant granulations. As a stimulant or astringent it is applied to ulcerated surfaces in order to contract the blood-vessels and arrest discharge. As an astringent it is useful as an injection into the vagina or urethra, and as a lotion in chronic ophthalmia.

Posology:—

As an astringent and tonic.

Horses	...	... ½ to 1 drachm.
Cattle ...	...	... ½ to 1 drachm.
Sheep ...	...	... 15 to 25 grains.
Pigs ...	...	... 5 to 10 grains.
Dogs ...	...	... ¼ to 2 grains.

As an emetic.

Pigs ...	...	... 10 to 15 grains.
Dogs ...	...	... 5 to 10 grains.

CUSSO.

Kousso.

Natural Order.—Rosaceæ.

Description.—Kousso consists of the dried panicles (chiefly of the female flowers) of the plant Hagenia abyssinica. Kousso exists in compressed clusters, or more or less cylin-

drical rolls, usually 10 inches or more in length. The panicles may, however, be broken up into small fragments. The colour is light-brown, or reddish in the case of the female flowers. The odour is slight and tea-like, the taste bitter, acrid, and not very pleasant. The panicles are branched, zigzag, more or less covered with hairs and glands, and with a large sheathing bract at the base of every branch. The flowers are numerous, small, shortly stalked, unisexual. There are two roundish membranous veiny bracts at the base of each flower. The bracts are brownish-yellow in the male, and tinged with red in the female flowers. The calyx is hairy externally, possesses veins, and is divided into ten segments in two alternating whorls.

Therapeutics.—Kousso is an anthelmintic, rapidly killing tape-worms. For dogs it is used occasionally for this purpose. The best method of using it for this animal is probably in the form of a concentrated infusion taken two or three times at intervals during the day, the animal only being allowed to take liquid during the time. On the following day a full dose of jalap or other purgative should be given.

Posology:—

Dog ... ... 1 to 4 drachms.

DECOCTUM PAPAVERIS.

Decoction of Poppy.

Natural Order.—The Poppy belongs to the Papaveraceæ.

Mode of Preparation.—Boil 2 ounces of bruised poppy capsules with 1½ pints of distilled water for ten minutes in a covered vessel. Then strain, and pour as much distilled water over the contents of the strainer as will make the strained product measure a pint.

Use.—Decoction of poppy is only used externally to allay pain.

DIGITALIS FOLIA.

Digitalis or Foxglove Leaves.

Natural Order.—Scrophulariaceæ.

Description.—The leaves of the plant, Digitalis Purpurea, the purple Foxglove, should be collected from wild British plants of the second year's growth, when about two-thirds of the flowers are expanded and carefully dried. They vary from 4 to 12 or more inches in length, and may be as much as 5 or 6 inches broad. The petiole or stalk is winged on both sides for a varying length. The lamina or blade of the leaf is ovate or ovate-lanceolate, subacute, crenate, and somewhat wrinkled. The upper surface is slightly hairy and dull-green, and shows the veins markedly, while the under surface is downy. The taste is very bitter and unpleasant, and the odour is faint, agreeable, and tea-like.

Preparations :—

Infusum Digitalis (3 grains to 1 fluid ounce, nearly).
Tinctura Digitalis ($54\frac{1}{2}$ grains to 1 fluid ounce).

Action.—The chief effect of digitalis is upon the organs of circulation. In the first stage of its action the veins are emptied and the arteries filled. This effect is brought about by the stimulation of the vagus, on the heart and medulla oblongata, and, in consequence of the stimulation of the ganglia in the heart, the beats are strengthened. The blood-pressure rises from this cause and from stimulation of the vaso-motor centre and vaso-motor nerves. The diastole being lengthened the ventricles have more time to fill and they contract with additional force. In the second stage the water of the urine is increased owing to depression of the vaso-motor mechanism of the renal arteries. In the third stage the circulation begins to lose force, and lastly

death occurs through its failure. The temperature is raised a little at first and is then lowered through the increased circulation through the skin.

Uses.—The especial use of digitalis is in certain conditions of functional and organic diseases of the heart. The cases where its administration is indicated are those in which the circulatory power fails, the pulse being felt to be small, weak, and irregular, the veins being distended, and difficulty of breathing, with congestion of the lungs and general dropsy and hæmorrhage perhaps supervening. It is of special value in the treatment of disease of the mitral and tricuspid valves, in dilatation of the left ventricle, and also in hypertrophy of the left ventricle, in those instances in which the pulse becomes feeble and small in volume. In pure hypertrophy aconite is the remedy indicated. Digitalis is contra-indicated in acute diseases of the heart. In chronic disease of the aortic valves, digitalis must not be given in the early stages, as it prolongs the diastole and thus permits greater influx of blood. In the later stages it is sometimes given with benefit. In functional or nervous palpitation with debility small doses are very valuable. Also when the tumultuous action is dependent upon overwork digitalis is indicated. Digitalis is administered as a cardiac stimulant in horses with acute pneumonia. In pericarditis after abatement of the acute symptoms it is often given, and in thick and broken wind it has a good action. In canine practice digitalis is often given as a cardiac tonic for the debility following distemper. When digitalis is administered it is necessary to watch its effect carefully, as it may cause intermittence of the pulse. Although it is not a cumulative poison it is rarely advisable to continue its administration for long.

Posology :—

	Powdered leaves.
Horses ...	... 10 to 30 grains.
Cattle ...	... 30 to 60 grains.
Sheep ...	... 5 to 15 grains.
Pigs ...	... 3 to 6 grains.
Dogs ...	... 1 to 3 grains.

EMPLASTRUM PICIS.

Pitch Plaster.

Mode of Preparation.—Take of

Burgundy Pitch, 26 parts;
Common Frankincense, 13 parts;
Resin, 4½ parts;
Yellow Wax, 4½ parts;
Olive Oil, 2 fluid parts;
Water, 2 fluid parts.

Melt together the frankincense, Burgundy pitch, resin, and wax; add the oil and the water, and then, with constant stirring, evaporate to a proper consistence.

ENEMATA.

Enemas or Clysters.

Enemas or clysters serve several useful purposes. Simple enemas of tepid water or of soap and water are commonly injected with the view of promoting the action of the bowels by increasing the peristaltic action, and also by their softening action on the hardened fæces. They are also of value in diminishing spasm of the bowels in colic in horses. One may inject 1 to 2 gallons or more of fluid for this purpose into the rectum of the horse. In the dog, half to one pint is the usual amount necessary. In cases of invagination or intussusception of the bowels, the copious injection of tepid water is of great service. Medicated clysters are

employed in cases of tetanus, sore throat, and other diseases in which it is not feasible to administer medicines by the mouth, and also in those instances where it is desired to exert a local action on the bowel. When the enema is to be retained, from 1 to 2 pints is in most instances sufficient for one injection in the horse. In the dog, about 4 ounces will be sufficient. Before introducing a medicated clyster into the horse, it is customary to remove the fæces in the rectum with the hand. The enema of aloes is useful for injecting into the rectum in constipation in horses, and the simple enema injected in constipation is sometimes followed by the injection of one of aloes. The enema of turpentine, or of aloes, or of perchloride of iron, is useful for the removal of worms. The enema of opium serves not only for the absorption of the drug into the system, but also for its local action in allaying irritation, spasm in diarrhœa and dysentery, and also in soothing irritation of the genito-urinary organs. The enema of tobacco is useful in horses in cases of lock-jaw, and also for the removal of worms. Nutritive clysters are given in those cases where food is not taken by the animal, from inability or disinclination in disease.

ENEMA ALOES.

Enema of Aloes.

Mode of Preparation.—Take of

Aloes, 4 drachms;
Carbonate of Potassium, 30 grains;
Mucilage of Starch, 1 pint.

Mix and rub together.

ENEMA OPII.

Enema of Opium.

Mode of Preparation.—Mix together 1 fluid part of tincture of opium with 32 fluid parts of mucilage of starch.

ENEMA TABACI.

Enema of Tobacco.

Infuse 2 drachms of tobacco in a pint of boiling water for half an hour, and strain.

ENEMA TEREBINTHINÆ.

Enema of Turpentine.

Mix together 1 fluid part of oil of turpentime and 15 fluid parts of mucilage of starch.

ERGOTA.

Ergot.

Description.—Ergot itself belongs to the fungi; the rye grass on which it is parasitic to the graminaceæ. Ergot is the sclerotium of Claviceps purpurea, produced between the pales, and replacing the grain of Secale cereale. It is subcylindrical and obscurely triangular in shape, and tapers towards the ends. It is generally arched or curved, and from one-third of an inch to about an inch and a half in length. There is at about the middle of each of the three sides a longitudinal furrow, more marked on that side which is concave, and often irregularly cracked, which may be said to appear to be the base of the triangle, or rather the elongated pyramid, to which the sclerotium may be compared. Externally ergot is of a violet-purple colour, and within it is white or pinkish-white. It easily snaps. The odour is peculiar and unpleasant, more especially if the powder be triturated with solution of hydrate of potassium. The taste is mawkish and rancid.

Preparations :—

Extractum Ergotæ Liquidum (1 ounce to 1 fluid ounce).

Infusum Ergotæ (11 grains to 1 fluid ounce).
Tinctura Ergotæ (109 grains to 1 fluid ounce).

Action.—The structures more especially acted upon by ergot are the circulatory and respiratory organs, the central nervous system, intestines, and uterus. Under its influence the arteries become contracted, the blood-pressure rises, and the pulse is reduced in frequency. The respiratory movements are diminished, the peristaltic action of the intestines is exalted, and the spinal cord is acted upon through the contraction of its vessels. The power which ergot has in stimulating and contracting involuntary muscle fibre, seen in the influence it exerts on the involuntary muscle fibre of the arteries, produces a marked effect on that of the uterus. This organ becomes anæmic and contracted, and this is more especially marked, if the animal be pregnant, and still more so if parturition has commenced. It has been shown that ergot owes its effects on the uterus and bowels to sphacelinic acid and cornutine, and not to ergotinic acid.

Uses.—Ergot is largely prescribed in veterinary practice. It is chiefly useful as a hæmostatic in controlling hæmorrhage, more especially that occurring after birth of the fœtus. The hypodermic injection of ergotin is of great efficacy in controlling sudden post-partum hæmorrhage, and is much to be preferred to the administration of the drug by the mouth, on account of the greater rapidity of the action by the former method. As an ecbolic ergot or ergotin is employed in cases of uterine inertia, where no obstruction or malformation of the mother or fœtus contra-indicates its administration. It is also given in those cases where the placenta is retained.

Ergotin is recommended by Mr. Briggs in cases of parturient apoplexy in cattle, and it may be given in doses of 25 to 30 grains. In *small doses* ergot is said to have

proved useful in preventing threatened abortion. In purpura hæmorrhagica in horses, ergot is often given along with other remedies.

Posology:—

Horses and cattle ...	... ½ to 1 ounce.
Sheep, pigs, and dogs	... 1 drachm.

These doses may be repeated at intervals of an hour or less.

Ergot is generally given in veterinary practice as infusion, tincture, liquid extract, or ammoniated liquor. The dose of the two latter preparations is the same as that of the powdered ergot.

Of ergotin the dose for a horse is about 10 grains, and for cattle a scruple to half a drachm.

ERGOTINUM.

Ergotin.

Description.—Ergotin is a purified extract of ergot.

Mode of Preparation.—Evaporate 4 fluid ounces of liquid extract of ergot by a water-bath to a syrupy consistence, and, when cold, add 4 fluid ounces of rectified spirit. Let it stand for half an hour, then filter, and evaporate the filtered liquid to the consistence of a soft extract.

Preparation.—Injectio Ergotini Hypodermica.

Posology:—

Horses ...	... 10 grains.
Cattle ...	... 20 to 30 grains.

Ergotin is administered hypodermically.

EXTRACTUM ACONITI.

Extract of Aconite.

Mode of Preparation.—Bruise in a stone mortar 112 pounds of the fresh leaves and flowering tops of the plant

Aconitum Napellus. Press out the juice, heat it gradually to 54·4° C., and separate the green colouring matter by means of a calico filter. Heat the strained liquor to 93·3° C. to coagulate the albumen, and again filter. Evaporate the filtrate by means of a water-bath to the consistence of a thin syrup. Then add to it the green colouring matter previously separated and passed through a hair sieve, and, stirring the whole together thoroughly, continue the evaporation at a temperature not above 60°C., until the extract is of a suitable consistence.

Posology :—

Horses	...	... 10 to 15 grains.
Cattle	...	... 15 to 30 grains.
Sheep	...	... 2 to 5 grains.
Pigs	...	... 2 to 5 grains.
Dogs	...	... ¼ to 1½ grains.

EXTRACTUM ANTHEMIDIS.

Extract of Chamomile.

Mode of Preparation.—Boil 1 pound of chamomile flowers with 1 gallon of distilled water, until the volume is reduced to one half. Strain, press, and filter. Evaporate the liquor by a water-bath until the extract is of a suitable consistence for forming pills, and add towards the end of the process 15 minims of oil of chamomile.

Posology.—Dogs, 3 to 10 grains.

EXTRACTUM BELÆ LIQUIDUM.

Liquid Extract of Bael.

Mode of Preparation.—Macerate 1 pound of bael fruit for 12 hours in 4 pints of distilled water, and pour off the clear liquor. Repeat the maceration a second and third time for one hour in 8 pints of water. Press

the marc, and filter the mixed liquors through flannel. Evaporate to 13 fluid ounces, and, when cold, add 3 fluid ounces of rectified spirit.

Posology :—

Horses ...	... 2 to 4 fluid ounces.
Foals ...	... 1 to 2 fluid ounces.
Cattle ...	... 4 to 6 fluid ounces or more.
Calves ...	... 1 to 3 fluid ounces.

EXTRACTUM BELLADONNÆ.

Extract of Belladonna.

Mode of Preparation.—Bruise in a mortar 112 pounds of the fresh leaves and young branches of Atropa Belladonna, and press out the juice. Heat it gradually to 54·4° C., and separate the green colouring matter by a calico filter. Heat the strained liquor to 93·3° C. to coagulate the albumen, and again filter. Evaporate the filtrate by a water-bath to the consistence of a thin syrup. Add to it the green colouring matter previously separated and passed through a hair-sieve, and, stirring the whole together thoroughly, continue the evaporation at a temperature not exceeding 60° C., until the extract is of a suitable consistence for forming pills.

Posology :—

Horses ...	... 1 to 2 drachms.
Cattle ...	... 2 to 3 drachms.
Sheep ...	... 20 to 30 grains.
Dogs ...	... 2 to 4 grains.

EXTRACTUM CANNABIS INDICÆ.

Extract of Indian Hemp.

Mode of Preparation.—Macerate 1 pound of Indian hemp in 4 pints of rectified spirit for seven days, and press

out the tincture. Distil off the greater part of the spirit, and evaporate what remains by a water-bath to the consistence of a soft extract.

Preparation.—Tinctura Cannabis Indicæ (1 ounce to 1 pint).

Posology.—Horses, 1 to 2 drachms.
Dogs, ½ to 1 grain.

EXTRACTUM CINCHONÆ LIQUIDUM.

Liquid Extract of Cinchona.

Mode of Preparation.—Take of

Red Cinchona Bark, in No. 60 powder, 20 ounces;
Hydrochloric Acid, 5 fluid drachms;
Glycerine, 2½ fluid ounces;
Rectified Spirit, a sufficient quantity;
Distilled Water, a sufficient quantity.

Mix with 5 pints of distilled water the acid and glycerine, and add the bark. Macerate, with frequent stirring, in a covered vessel for 48 hours; transfer to a percolator, and when the fluid ceases to pass, and the contents of the percolator have been properly packed, continue the percolation with water until 15 pints of liquid have passed, or until that which passes ceases to give a precipitate with an excess of solution of hydrate of sodium. Evaporate the percolated liquid in a porcelain or enamelled iron vessel at a temperature not exceeding 82·2° C., until it is reduced to 20 fluid ounces.

Then ascertain the alkaloidal strength of the liquid, and then evaporate it or dilute it so that every fluid part containing 5 grains of alkaloids in all may be brought to the volume of 85 grains. Then add to each such fluid part 12·5 fluid grains of rectified spirit, and finally adjust the volume to 100 fluid grains by the addition of distilled

water. Thus the liquid extract will contain 5 grains of the alkaloids of the bark in every 100 fluid grains.

Posology.—Dogs, 20 minims to 1 drachm.

EXTRACTUM CONII.

Extract of Hemlock.

Mode of Preparation.—Bruise 112 pounds of the fresh leaves and young branches of the plant, Conium maculatum, in a stone mortar, press out the juice, and heat it gradually to 54·4° C. Separate the green colouring matter by a calico filter. Heat the strained liquor to 93·3° C. to coagulate the albumen, and again filter. Evaporate the filtrate by means of a water-bath to the consistence of a thin syrup; then add to it the green colouring matter previously separated and passed through a hair-sieve, and, stirring the whole together assiduously, continue the evaporation at a temperature not exceeding 60° C., until the extract is of a suitable consistence for forming pills.

Posology :—

Horses	... 1 drachm.
Cattle	... 2 drachms.
Dogs	... 1 to 4 grains.

EXTRACTUM ERGOTÆ LIQUIDUM.

Liquid Extract of Ergot.

Mode of Preparation.—Digest 1 pound of ergot in 4 pints of distilled water for 12 hours. Draw off the infusion, and repeat the digestion with 2 pints of distilled water. Press out, strain, and evaporate the liquors by means of a water-bath to 11 fluid ounces, and, when cold, add 6 fluid ounces of rectified spirit. Allow the mixture to stand for an hour to coagulate the albumen, and then filter. The product should measure 16 fluid ounces.

Preparation.—Ergotinum.

Posology :—

Horses ...	... ½ to 1 fluid ounce.
Cattle ...	... 1 to 2 fluid ounces.
Sheep, pigs, and dogs	1 fluid drachm.

EXTRACTUM FILICIS LIQUIDUM.

Liquid Extract of Male Fern.

Mode of Preparation.—Closely pack 2 pounds of male fern coarsely powdered into a percolator, and pass 4 pints or more of ether slowly through it, until it passes through without colour. Let the ether evaporate on a water-bath, or recover it by distillation, and preserve the oily extract.

Posology :—

Horses and cattle	2 to 6 fluid drachms.
Sheep ...	... 30 minims to 1 fluid drachm.
Dogs and cats	... 10 minims to 1 fluid drachm.

EXTRACTUM GENTIANÆ.

Extract of Gentian.

Mode of Preparation.—Infuse 1 pound of gentian root sliced in 1 gallon of boiling distilled water for 2 hours, boil for 15 minutes, pour off, press, and strain. Then evaporate the liquor by a water-bath, until the extract is of a suitable consistence for forming pills.

Posology :—

Horses and cattle	... 1 ounce.
Dogs ...	... 3 to 10 grains.

EXTRACTUM HÆMATOXYLI.

Extract of Logwood.

Mode of Preparation.—Infuse 1 pound of logwood in fine chips in 1 gallon of boiling distilled water for 24 hours, then boil down to ½ gallon, strain, and evaporate to dryness

by a water-bath, stirring with a wooden spatula. Iron vessels must not be used.

Posology.—Cattle, 1 to 2 ounces.

EXTRACTUM HYOSCYAMI.

Extract of Henbane.

Mode of Preparation.—See Extractum Conii. The mode of preparation is exactly the same.

Posology:—

Horses and cattle	... 1 drachm.
Sheep and pigs	... 5 to 10 grains.
Dogs ...	... 2 to 5 grains.

EXTRACTUM JABORANDI.

Extract of Jaborandi.

Mode of Preparation.—Mix 1 pound of Jaborandi with 2 pints of proof spirit, and macerate in a closed vessel for 48 hours. Transfer to a percolator, and, when the fluid ceases to pass, continue the percolation with water until 2 pints of liquid have been collected. Evaporate the percolated liquid until the extract has acquired a suitable consistence.

Posology:—

Horses and cattle	... 20 to 40 grains.
Sheep, pigs, and dogs	... 5 to 10 grains.

EXTRACTUM NUCIS VOMICÆ.

Extract of Nux Vomica.

Mode of Preparation.—Heat 1 pound of the previously split nux vomica seeds to a temperature of 100° C. for 3 hours, and then reduce to a fine powder. Mix 64 fluid ounces of rectified spirit with 16 fluid ounces of distilled water, and make the powdered nux vomica into a paste

with 1 pint of the mixture. Allow this to macerate for 12 hours, then transfer to a percolator, and add another pint of the mixture. When this has percolated, pour on the remainder of the diluted spirit in successive portions; press the marc, filter the expressed liquor, and add it to the percolated liquid. Take of the percolated liquid as much as contains 131¼ grains of total alkaloid, distil off the spirit, and evaporate over a water-bath until the extract weighs 2 ounces. This extract will contain 15 per cent. of total alkaloid.

Preparation.—Tinctura Nucis Vomicæ.

Posology :—

Horses	...	... 4 to 8 grains.
Cattle	...	... 10 to 15 grains.
Sheep	...	... 1 to 5 grains.
Pigs	...	... 1 to 2 grains.
Dogs	...	... $\frac{1}{10}$ to $\frac{1}{4}$ grain.

EXTRACTUM OPII.

Extract of Opium.

Mode of Preparation.—Macerate 1 pound of opium in 2 pints of distilled water for 24 hours, and express the liquor. Thoroughly mix the residue of the opium with 2 pints of water, macerate again for 24 hours and express. Repeat the operation a third time. Mix the liquors, strain through flannel, and evaporate by a water-bath until the product weighs half a pound. Extract of opium should contain about 20 per cent. of morphine.

Preparations :—

Extractum Opii Liquidum (1 ounce in 1 pint).

Posology.—Extract of opium is rarely prescribed in veterinary practice. The dose is one half that of solid opium.

EXTRACTUM PHYSOSTIGMATIS.

Extract of Calabar Bean.

Mode of Preparation.—Macerate 1 pound of Calabar bean, in No. 40 powder, for 48 hours with 1 pint of rectified spirit in a closed vessel, agitating occasionally. Then transfer to a percolator, and, when the fluid ceases to pass, add 3 pints of rectified spirit, so that it may slowly percolate through the powder. Subject the residue of the bean to pressure, and add the expressed liquor to the product of the percolation. Filter, distil off most of the spirit, and evaporate what is left in the retort by a water-bath to the consistence of a soft extract.

Preparation.—Physostigmina.

Posology:—

Horses and cattle	...	1 to $1\frac{1}{2}$ grains.
Dogs	...	... $\frac{1}{8}$ grain.

FERRI ARSENIAS.

Arseniate of Iron.

Chemical Composition.—The formula of arseniate of iron is $Fa_3As_2O_8$, but the salt generally contains some oxide.

Mode of Preparation.—Take of

Sulphate of Iron, $20\frac{3}{4}$ ounces;
Arseniate of Sodium dried at 148·9° C., $15\frac{3}{4}$ ounces;
Bicarbonate of Sodium, $4\frac{1}{2}$ ounces;
Boiling Distilled Water, a sufficient quantity.

Dissolve the arseniate of sodium in about 5 pints, and the sulphate of iron in about 6 pints of the water, mix the two solutions, adding the bicarbonate of sodium dissolved in a little distilled water. Stir thoroughly. Collect the white precipitate which has formed on a calico filter, and

wash until the washings cease to be affected by a diluted solution of chloride of barium. Squeeze the washed precipitate between folds of strong linen in a screw-press, and dry it on porous bricks in a warm air-chamber, the temperature of which does not exceed 37·8° C.

Characters.—Arseniate of iron is a tasteless, amorphous powder of a greenish colour.

Tests.—It is insoluble in water, but readily dissolved by hydrochloric acid. The solution in hydrochloric acid gives a copious light-blue precipitate with ferrocyanide of potassium, and a still more abundant one of a deeper colour with ferricyanide of potassium. A small quantity boiled with excess of hydrate of sodium and filtered, gives, when exactly neutralised by nitric acid, a brick-red precipitate on the addition of solution of nitrate of silver. The solution in hydrochloric acid when diluted gives no precipitate with chloride of barium.

Therapeutics.—Arseniate of iron combines the properties of its two elements, and is prescribed with other remedies as a tonic and alterative in horses.

Posology :—

Horses	...	... 5 to 10 grains.

FERRI CARBONAS SACCHARATA.

Saccharated Carbonate of Iron.

Chemical Composition.—Saccharated carbonate of iron consists of carbonate of iron, $FeCO_3xH_2O$, mixed with peroxide of iron and sugar. The carbonate, if reckoned as anhydrous, forms about one-third of the mixture.

Mode of Preparation.—Take of

Sulphate of Iron, 2 ounces ;
Carbonate of Ammonium, $1\frac{1}{4}$ ounce ;
Boiling Distilled Water, 2 gallons ;
Refined Sugar, 1 ounce.

Dissolve the sulphate of iron and the carbonate of ammonium each in half a gallon of water, and mix the two solutions with brisk stirring in a deep cylindrical vessel, which must then be covered as accurately as possible. Set the mixture by for 24 hours, and from the precipitate which has subsided separate the supernatant solution by a siphon. Pour on the remainder of the water, stir well, and, after subsidence, again remove the clear solution. Collect the resulting carbonate on a calico filter, subject it to expression, and rub it with the sugar in a porcelain mortar. Finally, dry the mixture at a temperature not exceeding 100° C.

Characters.—Saccharated carbonate of iron consists of small coherent lumps of a grey colour with a sweet and characteristic taste of iron.

Tests.—It dissolves, like other carbonates, with effervescence in warm hydrochloric acid diluted with half its volume of water, and the solution should give but a very slight precipitate with chloride of barium.

Therapeutics.—The saccharated carbonate of iron is often prescribed for dogs, for which it is a very suitable preparation.

Posology :—

Horses	...	... 1 to 2 drachms.
Dogs	...	... 5 to 10 grains.

FERRI ET AMMONII CITRAS.

Citrate of Iron and Ammonium.

Mode of Preparation.—Take of

Solution of Persulphate of Iron (10 fluid ounces, or a sufficiency) ;

Solution of Ammonia (23 fluid ounces, or a sufficiency) ;

Citric acid, 4 ounces ;

Distilled Water, a sufficiency.

Mix 16 fluid ounces of the solution of ammonia with 2 pints of distilled water, and to this add gradually the solution of persulphate of iron, previously diluted with 2 pints of distilled water, stirring them constantly and well, and taking care that ammonia is, even finally, in slight excess, as indicated by the odour. Let the mixture stand for 2 hours, stirring it occasionally. Then put it on a calico filter, and when the liquor has drained away, wash the precipitated ferric hydrate with distilled water until that which passes through the filter ceases to give a precipitate with chloride of barium. Dissolve the citric acid in 4 ounces of distilled water, submit the solution to the heat of a water-bath, add the ferric hydrate, and stir them well together, until nearly the whole of the ferric hydrate has dissolved, or until the citric acid is saturated with ferric hydrate, a little more of which, if necessary for this purpose, may be prepared and added. Let the solution cool, and then add $5\frac{1}{2}$ fluid ounces of solution of ammonia. Filter through flannel, adding a little more distilled water if necessary. Evaporate to the consistence of syrup, maintaining the presence of a very slight excess of ammonia, and dry in thin layers on flat porcelain or glass plates at a temperature not exceeding 37·8° C. Remove the dry salt in flakes, and preserve it in a stoppered bottle.

Characters.—Citrate of iron and ammonium exists in thin transparent scales of a deep red colour. Its taste is slightly sweetish and astringent.

Tests.—It feebly reddens blue litmus, is soluble in water, and almost insoluble in rectified spirit.

When heated with hydrate of potassium or sodium, like all salts of ammonium it evolves the gas ammonia, and deposits ferric hydrate; and the alkaline solution from which the iron has thus separated does not, when slightly supersaturated with acetic acid, give any crystalline deposit.

When incinerated with free exposure to air, it leaves about 30 per cent. of peroxide of iron, which is not alkaline.

Therapeutics.—The citrate of iron and ammonium is a very useful form in which to prescribe iron, especially in equine and canine practice.

Posology :—

Horses	...	... 1½ to 2 drachms.
Dogs	...	... 5 to 10 grains.

FERRI ET QUININÆ CITRAS.

Citrate of Iron and Quinine.

Mode of Preparation.—Ferric hydrate, freshly prepared by precipitating a solution of persulphate of iron by ammonia, is dissolved in solution of citric acid. Quinine is then precipitated from a solution of sulphate of quinine in a little diluted sulphuric acid, by means of ammonia. The quinine thus prepared is added to the solution of ferric hydrate in citric acid, and the mixture is exposed to the heat of a water-bath until the quinine is dissolved. The solution of the double citrate which is formed is then evaporated in thin layers on porcelain or glass plates, just as in the case of the ammonio-citrate of iron.

Characters.—Citrate of iron and quinine exists in the form of thin scales of a greenish-golden-yellow colour. It is slightly deliquescent and entirely soluble in cold water. The taste is bitter, like quinine, and also chalybeate.

Tests.—The solution is very slightly acid.

With solution of hydrate of sodium a reddish-brown precipitate is formed, with solution of ammonia a white precipitate, with ferrocyanide and with ferricyanide of potassium a blue, and with tannic acid a greyish-black. When the salt is burned with exposure to air, it leaves a residue which when moistened with water is not alkaline in reaction.

Therapeutics.—Citrate of iron and quinine has been prescribed in equine and canine practice in cases where the action of iron and quinine is desired.

Posology :—

Horses	...	... 1 to 2 drachms.
Dogs	...	... 5 to 10 grains.

FERRI PEROXIDUM HYDRATUM.

Hydrated Peroxide of Iron.

Formula.—Fe_2O_3,H_2O, or $Fe_2O_2(HO)_2$.

Mix 4 fluid ounces of solution of persulphate of iron with a pint of distilled water, and add this diluted solution gradually to 33 fluid ounces of solution of hydrate of sodium, stirring them constantly and briskly. Let the mixture stand for 2 hours, stirring occasionally, and then put it on a calico filter. When the liquid has drained away, wash the precipitated ferric hydrate with distilled water, until the washings cease to give a precipitate with chloride of barium. Dry the peroxide at a temperature not exceeding 100°C., until it ceases to lose weight, and then reduce it to a fine powder.

Characters.—Hydrated peroxide of iron is a reddish-brown tasteless and non-magnetic powder.

Tests.—It dissolves completely with the aid of heat in hydrochloric acid, diluted with half its volume of water. The solution in hydrochloric acid gives a copious blue precipitate with ferrocyanide of potassium, but none with the ferricyanide of the same metal. If heated to dull redness in a test-tube, hydrated peroxide of iron yields about 10 per cent. of moisture.

Therapeutics.—Hydrated peroxide of iron is prescribed in cases of acute arsenical poisoning, against which it has

valuable antidotic properties, forming with arsenious acid an almost insoluble compound (a basic arsenite).

Posology :—

Horses ... ... 1 to 2 ounces.

The dose may be repeated at intervals of a quarter of an hour.

FERRI PHOSPHAS.

Phosphate of Iron.

Chemical Composition. — Pure ferrous phosphate, $Fe_3(PO_4)_2 8H_2O$, must be present to the extent of at least 47 per cent. Ferric phosphate and some oxide are also generally contained in the salt.

Mode of Preparation.—Dissolve 3 ounces of sulphate of iron in 30 ounces of boiling distilled water, and also $2\frac{3}{4}$ ounces of phosphate of sodium in 30 ounces of boiling distilled water. When both solutions have cooled to about 46° C., mix the two, at the same time adding an aqueous solution of $\frac{3}{4}$ ounce of bicarbonate of sodium. Mix the three solutions thoroughly, transfer the precipitate which is formed to a calico filter, and wash it with hot distilled water, until the filtrate ceases to give a precipitate with solution of chloride of barium, thereby proving that no sulphate is left mixed with the phosphate of iron. Finally, dry the precipitated phosphate of iron at a temperature not higher than 48·9°C.

Character.—Phosphate of iron is a slate-blue amorphous powder.

Tests.—It is insoluble in water, but soluble in hydrochloric acid. This solution gives a blue precipitate with both the ferrocyanide and the ferricyanide of potassium. The precipitate produced by ferricyanide should be the most abundant, proving that ferrous phosphate is in excess of the ferric phosphate. When phosphate of iron is treated

with tartaric acid and an excess of ammonia, and finally with a solution of ammonio-sulphate of magnesium, a crystalline precipitate of phosphate of magnesium is produced. When the salt is boiled in hydrochloric acid, together with a strip of pure copper, no dark deposit should form on the copper.

Preparation.—Syrupus Ferri Phosphatis.

Therapeutics.—Phosphate of iron is seldom employed in veterinary practice, but the syrup is a very useful preparation for rickets, debility, and in recovery from distemper and other diseases.

FERRI SULPHAS.

Sulphate of Iron.

Formula.—$FeSO_4,7H_2O$.

Mode of Preparation.—Pour $1\frac{1}{2}$ pint of distilled water on 4 ounces of pure iron wire in a porcelain dish, add 4 fluid ounces of sulphuric acid, and when the evolution of the gas hydrogen has nearly ceased, boil for ten minutes. Filter through filtering-paper, and, after the lapse of 24 hours, separate the crystals which will have been deposited from the solution. Dry them on filtering-paper placed on porous bricks, and preserve in a stoppered bottle.

Characters.—Sulphate of iron exists in oblique rhombic prisms, which are of a pale green colour, and possess a styptic taste.

Tests.—The salt is insoluble in rectified spirit, but soluble in water.

The aqueous solution is clear, gives a white precipitate with chloride of barium, a blue one with ferricyanide of potassium, a white or generally rather a light-blue one with ferrocyanide of potassium, and no precipitate with sulphide of hydrogen.

Preparation.—Ferri Sulphas Exsiccata (4 parts of sulphate of iron yield $2\frac{1}{2}$ of the dried sulphate of iron).

Therapeutics.—Sulphate of iron is one of the most largely employed of the salts of iron in veterinary practice. It has powerful hæmatinic properties, and consequently proves of great value in anæmia and debility in all classes of patients. Having greater astringent properties than the citrate, it is especially suitable for cases of anæmia accompanied by diarrhœa, and for this reason also it is often prescribed in dysentery. It is rather liable to cause gastric disturbance, more especially if given in the form of a ball, and for this reason the citrate or tartrate are for general purposes often to be preferred. As a general tonic, however, it is largely employed in debility depending upon a large diversity of causes. As a vermicide in horses it is given by the mouth, or as an injection by the rectum. One drachm of the salt administered daily acts beneficially in destroying ascarides. The bowels should be kept open by combining with the iron salt a small dose of aloes.

Owing to the liability to cause gastric derangement, it is advisable not to continue the administration of sulphate of iron longer that 8 or 9 days.

Externally sulphate of iron has stimulant and astringent properties, and is employed as a powder or in solution.

Posology :—

Horses... ...	... 1 to 2 drachms.
Cattle	... 2 to 3 drachms.
Sheep	... 10 to 15 grains.
Pigs	... 10 to 20 grains.
Dogs	... 5 to 10 grains.

FERRI SULPHAS EXSICCATA.

Dried Sulphate of Iron.

Formula.—$FeSO_4,H_2O$.

Mode of Preparation.—Expose 4 ounces of sulphate of iron in a porcelain or iron dish to a temperature of 100° C.,

until aqueous vapour is no longer given off. Reduce the residue, which should weigh rather less than 2½ ounces, to a fine powder, and preserve it in a stoppered bottle.

Posology.—The dose of the dried sulphate is in the relation of 2½ to 4 of the sulphate.

FERRI SULPHAS GRANULATA.

Granulated Sulphate of Iron.

Formula.—$FeSO_4,7H_2O$.

Mode of Preparation.—Pour 1½ pint of distilled water on 4 ounces of pure iron wire placed in a porcelain capsule, and add 4 fluid ounces of sulphuric acid. When the evolution of hydrogen has nearly ceased, boil for 10 minutes, and then filter the solution into a jar which contains 8 fluid ounces of rectified spirit, stirring the mixture so that the salt shall separate in minute granular crystals. Deprive these of the liquid which adheres to them by decantation, and transfer them on filtering paper to porous tiles. Dry them by exposure to the atmosphere, and preserve in a stoppered bottle.

Characters.—Granulated sulphate of iron exists in the form of small granular crystals of a pale greenish-blue colour.

Posology.—The dose is the same as that of sulphate of iron.

FERRUM.

Iron.

Description.—The symbol is Fe, and the atomic weight 56. For the preparation of the iodide, the sulphate, and the granulated sulphate, annealed iron wire, of about No. 35 wire-gauge, and wrought-iron nails, both of which are non-resilient and free from oxide, should be used.

Preparations :—

Ferri Arsenias.
Ferri Carbonas Saccharata.
Ferri et Ammonii Citras.
Ferri et Quininæ Citras.
Ferri Peroxidum Hydratum.
Ferri Phosphas.
Ferri Sulphas.
Ferri Sulphas Exsiccata.
Ferri Sulphas Granulata.
Ferrum Redactum.
Liquor Ferri Dialysatus.
Liquor Ferri Perchloridi.
Liquor Ferri Perchloridi Fortior.
Syrupus Ferri Iodidi.
Syrupus Ferri Phosphatis.
Tinctura Ferri Perchloridi.
Vinum Ferri.

FERRUM REDACTUM.

Reduced Iron.

Composition.—Reduced iron consists of metallic iron, mixed with a variable amount of magnetic oxide.

Mode of Preparation.—Add to 1 fluid part of strong solution of perchloride of iron, 5 fluid parts of water. Pour the mixture into sufficient solution of ammonia diluted with 5 volumes of water, that the whole, after stirring, may still have a distinct odour of ammonia. Wash the ferric hydrate which is precipitated, until the washings give no precipitate with solution of nitrate of silver. Dry the precipitate, and introduce it into an iron tube, confining it to the middle part of the tube by plugs of asbestos. Raise

the tube by means of a furnace to a strong but not bright red heat, and then cause pure hydrogen to traverse it. This gas is made by acting on zinc with sulphuric acid diluted with eight times its volume of water, and is rendered quite dry by being made to pass firstly through sulphuric acid, which absorbs water, and then through a tube 18 inches long packed with small fragments of chloride of calcium. The farther end of the iron tube must be connected by a cork with a bent tube which dips under water. When the hydrogen passes through the water at about the same rate that it passes through the sulphuric acid, the furnace should be allowed to cool down to the temperature of the atmosphere, the passage of hydrogen being still continued. The reduced iron is then removed, and placed in a dry and well-stoppered bottle.

Characters.—Reduced iron is a fine greyish-black powder, strongly attracted by a magnet. When rubbed firmly in a mortar it exhibits metallic streaks.

Tests.—Reduced iron dissolves in hydrochloric acid, setting free the hydrogen of the acid, and uniting with the chlorine, and not giving off any sulphide of hydrogen. The chloride thus formed gives a light-blue precipitate with ferrocyanide of potassium.

Posology.—Horses, 1 drachm.

Therapeutics of Iron and its Salts.—Iron salts enter the circulation as chloride and alkaline albuminate, and then combine with the hæmoglobin of the red blood-cells. They owe their special therapeutic value to their hæmatinic properties, in virtue of which the number of the red blood corpuscles is increased. In anæmia, therefore, iron is the most important of all medicinal agents. The tonic action

of the salts of iron is indirect, being due to the increase in the number of the red cells, and the consequent greater capacity of the blood for absorbing and distributing oxygen throughout the system. As iron passes out of the body it has an astringent effect. Most of its salts cause constipation, and the more astringent ones, such as the perchloride, pernitrate, and sulphate, have been administered with the object of checking diarrhœa and dysentery in animals. It is important not to give iron in constipated states of the bowels unless it be combined with a purgative, such as aloes or Epsom salts. Iron is only excreted in small quantities by the kidneys. Hæmorrhage from these organs and from the bladder is controlled by iron; passive hæmorrhages also, from the uterus and other mucous surfaces, are arrested by iron, its hæmostatic power in this respect being due to its remote action. Its astringent properties, also possessed in virtue of its remote action, render it of value in chronic discharges from the mucous surfaces, and in leucorrhœa especially it is very beneficial.

Reduced iron, saccharated carbonate of iron, dialysed iron, and the moist peroxide of iron have but little astringency. The sulphate, the solution of the perchloride, and the solution of the pernitrate have great astringent powers, and are therefore especially indicated where the hæmostatic and astringent action are required internally or externally. The citrate and the acetate of iron are the least constipating, and the mildest of the preparations of iron.

Arseniate of iron is given when it is desired to act on the liver or skin; iodide of iron in scrofulous diseases; phosphate of iron in cases of disease of the bones, such as rickets in dogs.

Externally the persalts of iron have hæmostatic or styptic properties, and are used as such. The strong solution of perchloride is injected, when mixed with 3 to 6 parts of

water, into the uterus to arrest post-partum hæmorrhage. Cotton-wool soaked in a solution of the same strength is also used to stop bleeding from wounds. When a weak solution of a persalt of iron is injected into the rectum it destroys any worms which may be present.

FILIX MAS.

Male Fern.

Natural Order.—Filices.

Description.—The rhizome, with the persistent bases of the petioles of the plant Aspidium Filix-mas, should be collected late in the autumn, divested of its scales, roots, and all dead portions, and carefully and gently dried at a low temperature. It should not be used if more than a year old.

Characters.—The rhizome itself varies from 3 to 6 inches or more in length, and from $\frac{3}{4}$ inch to 1 inch in diameter; but covered as it is by the hard, curved, dark brown bases of the petioles, it is apparently 2 or more inches broad. Externally it is brown, internally yellowish-white or brownish. The odour is feeble but disagreeable. The taste is sweetish and astringent at first, but subsequently bitter and nauseous.

Preparation.—Extractum Filicis Liquidum.

Therapeutics.—Male fern is an anthelmintic, and is one of the most effectual remedies for tape-worms, especially in dogs. Its use should be followed by the administration of a purgative, and it should be given to the animal fasting. The powder is very bulky, and it is therefore not nearly so suitable as the liquid extract.

Posology:—

Horses and cattle	... 8 ounces.
Sheep ...	... 3 to 5 ounces.
Dogs and cats	... 2 ounces.

GALBANUM.

Galbanum.

Description.—Galbanum is a gum-resin obtained from Ferula galbaniflua, Ferula rubricaulis, and probably from other species. It exists in the form of tears, or in that of agglutinated tears. The tears are roundish or irregular in form, and vary in size from that of a pea, which is not generally exceeded, to that of a hazel-nut. They are yellowish-brown, orange-brown, or yellowish-green, translucent, usually rough and dirty on the surface, hard and brittle in cold weather, but softer in the warmer weather, and ductile and sticky when exposed to the heat of the hand.

The masses generally contain pieces of root, stem, and other impurities, and are hard, compact, and irregular in form. The odour is peculiar, aromatic, and not disagreeable. The taste is bitter, somewhat alliaceous and unpleasant.

Therapeutics.—Galbanum is chiefly used in veterinary practice for making charges and plasters. It has somewhat similar properties to asafœtida; and has been administered with the object of allaying spasmodic cough. The dose is the same as that of asafœtida.

GALLA.

Galls.

Natural Order.—Cupuliferæ.

Description.—Galls are excrescences on the tree, Quercus lusitanica, var. infectoria, caused by the puncture and deposit of an egg or eggs of Cynips Gallæ tinctoriæ. A gall is a hard, heavy sub-globular body, which is from $\frac{1}{2}$ inch to $\frac{3}{4}$ inch or more in diameter. The surface is tuberculated, the tubercles and intervening spaces being smooth. The colour is dark bluish-green, or dark olive-green exter-

nally, while internally it is yellowish or brownish-white. There is a small central cavity. The taste is extremely astringent, and this is followed by a slight sweetness.

Preparations:—

Acidum Gallicum.
Acidum Tannicum.
Tinctura Gallæ.
Unguentum Gallæ.

Therapeutics.—Galls have powerful astringent properties. They are prescribed for much the same purposes as tannic acid, to the presence of which they owe their activity. In passive hæmorrhages and chronic mucous discharges they are given internally. In cases of poisoning by vegetable alkaloids they are often employed, as also in poisoning by tartar emetic. Externally the ointment is useful in piles, and in prolapse of the rectum and uterus.

Posology:—

Horses	... 3 to 6 drachms.
Cattle	... 1 to 2 ounces.
Sheep and pigs	... ½ to 1 drachm.
Dogs	... 5 to 10 grains.

GENTIANÆ RADIX.

Gentian Root.

Natural Order.—Gentianaceæ.

Description.—The dried root of Gentiana lutea is in more or less cylindrical pieces or longitudinal slices, from a few inches to a foot or more in length, and from half an inch to about an inch thick. Those pieces which have been upper parts of the root are wrinkled in an annular manner. All parts are marked with irregular longitudinal furrows. Externally the colour is deep yellowish-brown, internally it is yellowish or reddish-yellow. When dry,

gentian root is brittle. The bark is thick, reddish, and separated from the central woody, somewhat spongy portion by a dark-coloured cambium zone. The odour is peculiar, and the taste, at first sweetish, becomes afterwards very bitter. An infusion when cold is not coloured blue by solution of iodine.

Preparations:—

Extractum Gentianæ.
Tinctura Gentianæ.

Therapeutics.—Gentian is the most extensively employed of all those remedies classed as bitters, and including chiretta, calumba, quassia, and others. It is especially useful as a general tonic and as a stomachic, and may be prescribed as powder, infusion, or tincture. The extract is useful for making pills for dogs.

The simple infusion and tincture are equally as serviceable in veterinary practice as the compound preparations of the British Pharmacopœia.

Posology:—

Horse ...	...	... ½ to 1 ounce.
Cattle ...	...	... 1 to 3 ounces.
Sheep ...	...	... 2 to 3 drachms.
Pigs ...	...	... 1 drachm.
Dogs ...	...	... 5 to 20 grains.

GLYCERINUM.

Glycerine.

Natural Order.—Oleaceæ.

Formula.—$C_3H_5(HO)_3$.

Mode of Preparation.—Glycerine separates from the olein, palmitin, or stearin contained in fats and fixed oils when they are saponified or distilled with superheated steam.

Characters.—Glycerine contains a small percentage of water. It is a clear, colourless liquid, oily to the touch, odourless, but with a pleasant sweet taste.

Tests.—It is freely soluble in water and in alcohol. When decomposed by heat it evolves intensely irritating vapours. The specific gravity is about 1·25. The aqueous solution is not affected by nitrate of silver, sulphydrate of ammonium, oxalate of ammonium, or by chloride of barium, and is neutral to litmus solution or paper. When it is shaken with an equal volume of sulphuric acid no colouration, or only a very slight straw colouration, should occur. When gently heated with diluted sulphuric acid, no rancid odour should be produced.

Preparations :—

Extractum Cinchonæ Liquidum.
Glycerinum Acidi Carbolici.
Glycerinum Acidi Tannici.
Glycerinum Boracis.
Lamellæ.
Linimentum Iodi.
Unguentum Iodi.

Therapeutics.—Glycerine is nutrient and demulcent when taken internally, and is administered to calves and dogs suffering from acidity and flatulence. Externally it has slightly stimulant, antiseptic, and hygroscopic properties, and is a valuable emollient in cases of cracked heels, mud fever, and in all cases where the skin is not too dry and brittle. It is a useful vehicle for borax, and tannic acid for sore mouths and aphtha, and with an equal quantity of Goulard's extract it is good, when suitably diluted with water, as a soothing and antiseptic application.

GLYCERINUM ACIDI CARBOLICI.

Glycerine of Carbolic Acid.

Mode of Preparation.—Rub together in a mortar 1 part of carbolic acid and 4 fluid parts of glycerine until the acid is dissolved.

GLYCERINUM ACIDI TANNICI.

Glycerine of Tannic Acid.

Mode of Preparation.—Stir together in a porcelain dish 1 part of tannic acid and 4 fluid parts of glycerine, and heat at a temperature not exceeding that of a water-bath until complete solution is effected.

GLYCERINUM BORACIS.

Glycerine of Borax.

Mode of Preparation.—Rub together in a mortar or heat gently 1 ounce of borax, 4 fluid ounces of glycerine and 2 fluid ounces of distilled water until the borax is dissolved.

GOSSYPIUM.

Cotton Wool.

Natural Order.—Malvaceæ.

Description.—Cotton wool consists of the hairs of the seed of Gossypium barbadense, and of other species of Gossypium, from which fatty matter and other impurities have been removed.

Characters.—Cotton wool is inodorous and tasteless, and is composed of white soft filaments. Each consists of an elongated tubular cell. When examined with the microscope it appears as a flattened twisted band with slightly thickened rounded edges.

Tests.—It should be readily wetted by water, and should not impart to it either an alkaline or an acid reaction. When ignited in the air cotton wool burns, leaving less than 1 per cent. of ash.

Preparation.—Pyroxylin.

Therapeutics.—Cotton wool may be medicated with carbolic acid, salicylic acid, thymol, perchloride of iron, iodine, or iodoform, thus forming a very convenient method of applying these remedies locally.

GUTTA PERCHA.

Gutta Percha.

Natural Order.—Sapotaceæ.

Description.—Gutta percha is the concrete juice of Dichopsis Gutta, and of several other trees belonging to the same natural order, Sapotaceæ. It exists in pieces of a light-brown or chocolate colour, which are tough, somewhat flexible, plastic above 48·8° C., insoluble in water, alcohol, or alkaline solutions, or diluted acids, but almost entirely soluble in chloroform, and entirely soluble in oil of turpentine, disulphide of carbon or benzol.

Therapeutics.—Gutta percha is used for making surgical appliances.

HÆMATOXYLI LIGNUM.

Logwood.

Natural Order.—Leguminosæ.

Description.—Logwood is the sliced heart-wood of Hæmatoxylon campechianum. The logs which are imported are hard, heavy, blackish-red externally, and reddish-brown internally. The chips have a reddish-brown colour, a slight peculiar and pleasant odour, and a sweetish astringent taste.

When chewed, logwood imparts to the saliva a brilliant dark reddish-pink colour.

Preparation.—Extractum Hæmatoxyli.

Therapeutics.—Hæmatoxylin has astringent properties in virtue of the tannic acid it contains. It is not so powerful in action as catechu, but is employed in the same classes of disease. The extract is very useful in cases of diarrhœa in cattle.

HYDRARGYRI AMMONIO-CHLORIDUM.

Ammonio-Chloride of Mercury.

Synonym.—Hydrargyrum Ammoniatum.

Mode of Preparation.—Dissolve 3 ounces of perchloride of mercury in 3 pints of distilled water by the aid of heat. Pour the aqueous solution of corrosive sublimate thus formed into 4 fluid ounces of solution of hydrate of ammonium diluted with 1 pint of distilled water, constantly stirring. Collect the precipitate on a filter, and wash it well with cold distilled water until the liquid which passes through ceases to give a precipitate when dropped into a solution of nitrate of silver acidulated with nitric acid. Dry the product at a temperature not exceeding 100° C.

Character.—Ammonio-chloride of mercury is an opaque white powder.

Tests.—Alcohol and ether do not act upon it at all, and water but slightly. If warmed together with hydrate of potassium it gives off ammonia gas, acquiring a pale-yellow colour, and the fluid filtered and acidulated with nitric acid gives a white precipitate with nitrate of silver. If boiled with a solution of stannous chloride, ammonio-chloride of mercury becomes grey, and yields globules of metallic mercury. It is entirely volatilized at a temperature below that of redness, without fusing. It should yield 77·5 per cent. of the element mercury.

Preparation.—Unguentum Hydrargyri Ammoniati (1 part in 10).

Therapeutics.—This preparation is used for external purposes, chiefly in the form of the Pharmacopœial ointment. It is very useful as a parasiticide, being very destructive to pediculi and fleas. In chronic inflammatory conditions of the skin it is likewise serviceable.

HYDRARGYRUM.

Mercury.

Symbol and Atomic Weight.—Hg = 200.

Characters. — Mercury is a brilliantly lustrous metal which at ordinary temperatures is fluid. It is easily divisible into spherical globules. At a temperature below that of visible redness mercury volatilizes, leaving no residue.

Preparations :—

(*a*) Containing mercury chiefly uncombined :

Hydrargyrum cum Creta (1 part in 3).
Linimentum Hydrargyri (1 part in 5).
Unguentum Hydrargyri (1 part in 2).

(*b*) Containing mercury variously combined :

Arsenii et Hydrargyri Iodidi Liquor.
Hydrargyri Iodidum Rubrum.
Hydrargyri Nitratis Liquor Acidus.
Hydrargyri Oxidum Flavum.
Hydrargyri Oxidum Rubrum.
Hydrargyri Perchloridi Liquor.
Hydrargyri Perchloridum.
Hydrargyri Subchloridum.
Hydrargyri Ammonio-Chloridum.
Lotio Hydrargyri Flava.
Lotio Hydrargyri Nigra.

Preparations (*continued*) :—

Oleatum Hydrargyri.
Unguentum Hydrargyri Ammonio-Chloridum.
Unguentum Hydrargyri Iodidi Rubri.
Unguentum Hydrargyri Nitratis.
Unguentum Hydrargyri Subchloridi.

Therapeutics of Mercury and its Salts.—The salts of mercury act upon the mouth, gums, and salivary glands, causing salivation. This is caused by their excretion by these organs. On the stomach and intestinal tract mercurials in large doses act as irritants, calomel or grey powder being often employed as purgatives in veterinary practice. The purgative effect of mercurial salts is due to the local action of the drugs, which it may be remarked are voided wholly in the fæces. It is believed that the intestinal glands are especially acted upon, while the peristaltic action of the intestines is exalted. Mercurials in this manner act as indirect cholagogues, owing to their hurrying on the watery fæces before it has time to become reabsorbed by the duodenal walls and carried back into the portal circulation. The liver having to make good the loss sustained by the bile which is passed away along with the fæces, is thus indirectly stimulated to action. Mercury has no direct effect on the blood, which it enters as an oxyalbuminate. On absorption into the blood mercury is soon deposited in the organs of the body, where it may remain a long time. Its exact mode of action is unknown. The alterative properties which it exerts in some forms of inflammatory action may be owing to its interfering with the growth or life of the germinal cells; partly also 'it may have a destructive influence on certain ferments and organisms connected with physiological and pathological metabolism' (Bruce).

Mercurial salts are sometimes prescribed in veterinary

practice as alteratives in controlling chronic inflammations, especially those of serous membranes. The especial uses of each preparation will be treated of under the respective headings.

Externally mercurial ointments and weak solutions of the bichloride are astringent, stimulant, and antiphlogistic. Stronger solutions of the bichloride and the acid solution of the nitrate are caustic. All mercurial applications have an antiseptic and disinfectant action. The constitutional effects of mercury can be obtained from its local application by inunction, or endermically or hypodermically. Mercury when applied externally therefore produces general as well as topical effects.

HYDRARGYRI IODIDUM RUBRUM.

Red Iodide of Mercury.

Synonyms.—Hydrargyri Biniodidum, Mercuric Iodide.

Formula.—HgI_2.

Mode of Preparation.—Dissolve 4 ounces of perchloride of mercury in 3 pints of boiling distilled water and 5 ounces of iodide of potassium in 1 pint of boiling distilled water, and mix the two solutions. When the temperature of the mixture has fallen to that of the atmosphere, decant the supernatant liquor from the precipitate. Collect the latter on a filter, wash it twice with cold distilled water, and dry it at a temperature not exceeding 100° C.

Characters.—Red iodide of mercury is a vermilion-coloured crystalline powder.

Tests.—It becomes yellow when gently heated over a lamp on a sheet of paper. It is almost insoluble in water, sparingly soluble in alcohol, freely in ether or in an aqueous solution of iodide of potassium. When digested with solution of hydrate of sodium it assumes a reddish-brown colour, and the fluid, if cleared by filtration and mixed with solution

of starch, gives a blue precipitate on being acidulated with nitric acid. It is entirely volatilized at a temperature under that of redness.

Preparations:—

Liquor Arsenii et Hydrargyri Iodidi (about 1 grain in 100).

Unguentum Hydrargyri Iodidi Rubri (1 part in 9).

Therapeutics.—The red iodide of mercury when applied externally acts as a powerful caustic. It is never used for internal purposes.

The ointment of the red iodide is the best application for the reduction of bony enlargements, such as splints, bone spavins, ring bones, and several other forms of osseous deposit. Likewise in the reduction of bursal enlargements it is most suitable. For enlarged and rheumatic joints it is largely used. It is also employed occasionally as a counter-irritant in cases of sore throat, roaring, and chronic cough.

HYDRARGYRI OXIDUM FLAVUM.

Yellow Oxide of Mercury.

Formula.—HgO.

Mode of Preparation.—Dissolve 4 ounces of perchloride of mercury in 4 pints of distilled water with the aid of heat. Add the solution thus formed to 2 pints of solution of hydrate of sodium, and stir the mixture well. Allow the yellow precipitate which is formed to subside, remove the supernatant liquor by decantation, thoroughly wash the precipitated oxide on a calico filter with distilled water, and finally dry it by the heat of a water-bath.

Tests.—Yellow oxide of mercury is a yellow powder readily soluble in hydrochloric acid. The solution thus formed gives with solution of ammonia a white precipitate. When heated to incipient redness it is entirely volatilized, being resolved into oxygen gas and the vapour of mercury.

Preparation.—Oleatum Hydrargyri.

Therapeutics.—The yellow oxide of mercury is not much employed in veterinary practice, but an ointment made with it has been used externally in reducing inflammation of the skin and in cases of irritable swollen conditions of the eyelids. The strength of the ointment for this purpose should be that of about 16 grains to the ounce of lard.

HYDRARGYRI OXIDUM RUBRUM.

Red Oxide of Mercury.

Synonym.—Red Mercuric Oxide.

Formula.—HgO.

Mode of Preparation.—Dissolve 4 ounces of mercury in $4\frac{1}{2}$ fluid ounces of nitric acid diluted with 2 fluid ounces of water. Evaporate the solution to dryness, and with the dry salt thus obtained triturate 4 ounces of mercury until the two are uniformly blended together. Heat the mixture in a porcelain dish, stirring well, until acid vapours cease to be evolved.

Tests.—Red oxide of mercury is an orange-red powder readily soluble in hydrochloric acid, yielding a solution which with solution of hydrate of potassium in excess gives a yellow precipitate, and with solution of hydrate of ammonium a white precipitate. Red oxide of mercury is entirely decomposed at a temperature under that of redness into oxygen gas and mercury vapour. Even when submitted to heat in a test-tube, no orange vapours should be given off.

Therapeutics.—Red oxide of mercury is applied externally as a caustic for the reduction of protuberant granulations on surface wounds and for promoting the healing of unhealthy callous ulcerated surfaces. It is used as powder or ointment. As an ointment it is employed for the reduction of glandular enlargements.

HYDRARGYRI PERCHLORIDUM.

Perchloride of Mercury.

Synonyms.—Corrosive Sublimate; Hydrargyri Bichloridum; Mercuric Chloride.

Formula.—$HgCl_2$.

Mode of Preparation.—Reduce 20 ounces of persulphate of mercury and 16 ounces of dried chloride of sodium each to fine powder. Mix together these two powders with 1 ounce of black oxide of manganese in fine powder by thorough trituration in a mortar. Place the mixture into an apparatus specially suitable for sublimation, and apply sufficient heat to cause vapours of perchloride of mercury to rise into the less heated part of the apparatus, which has been arranged for their condensation.

Characters.—Mercuric chloride exists in heavy colourless masses of prismatic crystals. The taste of this salt (which is an excessively poisonous one) is highly acrid and metallic.

Tests.—Perchloride of mercury is more soluble in alcohol than in water, and still more soluble in ether. An aqueous solution gives a yellow precipitate with hydrate of potassium, a white precipitate with hydrate of ammonium, and a curdy white precipitate with nitrate of silver. When heated it sublimes entirely without decomposition or residue.

Preparations:—

Hydrargyri Iodidum Rubrum.
Hydrargyrum Ammoniatum.
Liquor Hydrargyri Perchloridi ($\frac{1}{2}$ grain to 1 fluid ounce).
Lotio Hydrargyri Flava (18 grains to 10 fluid ounces).

Therapeutics.—As an internal remedy perchloride of mercury is not much used in veterinary practice. It has been prescribed in glanders and farcy in horses, and also in cases of elephantiasis or chronic weed. Its chief value however, is as an external application in numerous conditions.

The perchloride is the most active of all the preparations of mercury. It is a very powerful antiseptic. One part in 10,000 has been proved to destroy bacilli and micrococci, while 1 part in 1,000 destroys their spores. It has also astringent, stimulant, and caustic properties. As an application for wounds 1 part in 10,000 is sufficient for general purposes, but for foul sores, indolent ulcers, or protuberant discharging granulations, 1 in 500 (or about 3 grains to the ounce) is not too strong. Such a solution is also destructive of pediculi and the scab acarus, not only killing the parasite itself, but also preventing the hatching of the eggs. In ringworm it destroys the vegetable fungus and arrests the spreading of the growth. As a general disinfectant 1 part in 500 acts very efficiently for destroying the unhealthy walls of winding fistulæ. With this object, as also for destroying the walls of the fistulæ of quittor, 4 or 5 grains of the solid perchloride may be wrapped up in a thin strip of paper, which may then be passed deeply into the wound. This method causes sloughing of the unhealthy surface.

Posology :—

Horses ...	...	... $1\frac{1}{2}$ to 2 grains.
Cattle ..	...	... 2 to 3 grains.
Sheep and pigs	...	... $\frac{1}{4}$ to $\frac{1}{2}$ grain.
Dogs ...	...	... $\frac{1}{32}$ to $\frac{1}{16}$ grain.

HYDRARGYRI SUBCHLORIDUM.

Subchloride of Mercury.

Synonyms.—Calomel; Hydrargyri Chloridum; Mercurous Chloride.

Mode of Preparation.—Moisten 10 ounces of persulphate of mercury with boiling distilled water, and rub it with 7 ounces of mercury until no globules of mercury are visible. Add 5 ounces of dried chloride of sodium, and thoroughly mix by continued trituration. Sublime by means of a suitable apparatus into a chamber of such size that the calomel which is formed, instead of adhering to the sides as a crystalline crust, shall fall as a fine powder on its floor. Wash this powder with boiling distilled water until the washings are no longer darkened by a drop of sulphydrate of ammonium. Dry at a temperature not exceeding 100° C.

Characters.—Calomel is a dull-white, heavy, and nearly tasteless powder.

Tests.—The salt is sometimes rendered yellowish by trituration in a mortar. It is insoluble in water, spirit, or ether. Digested with solution of hydrate of potassium, calomel becomes black; and the clear solution, acidulated with nitric acid, gives a copious white precipitate with nitrate of silver. If placed in contact with hydrocyanic acid, calomel also becomes darkened. When sufficiently heated, the salt is entirely volatilized. Warm ether which has been shaken with it should leave on evaporation no residue whatever.

Preparations:—

Lotio Hydrargyri Nigra (3 grains to 1 fluid ounce).

Unguentum Hydrargyri Subchloridi (1 part in 6½, nearly).

Therapeutics.—Calomel is not nearly so frequently prescribed in veterinary practice as it formerly was. It is prescribed in equine practice as a purgative, more especially in cases of congestion of the liver. In inflammation of the serous membrane, more especially of the pleural, peritoneal and pericardial sacs, whether of the acute or chronic varieties, it is far less commonly given than in past years. As a vermicide it is not uncommonly given with santonine or other remedies, and for this purpose it acts well. As an aperient, calomel is the most suitable of all remedies in treating the constipation of tetanus in horses.

With aloes it forms a useful combination for opening the bowels in cases of so-called grease. In dogs it is advantageously combined with jalap, and in cattle and sheep with sulphate of magnesium or sodium. Externally, calomel is used as a powder for thrush of the foot in horses. It may be advantageously mixed for this purpose with an equal quantity of iodoform or powdered starch. In solution or as an ointment it is useful in killing pediculi or acari, as well as in allaying the irritation of prurigo. In eczematous eruptions on the limbs it also acts beneficially. A suitable ointment may be made for these purposes of 1 part of calomel to 8 of lard.

Posology:—

As a purgative (with other agents).

Horses ...	... 1 drachm.
Cattle ...	... 1 to 1½ drachms.
Dogs ...	... 2 to 3 grains.

As an alterative.

Horses ...	... 10 to 40 grains.
Cattle ...	... 10 grains to 1 drachm.
Sheep and pigs	... 5 to 20 grains.
Dogs ...	... 1 to 3 grains.

These latter doses may be repeated twice daily.

HYDRARGYRUM AMMONIATUM.

Ammoniated Mercury.

See Hydrargyri Ammonio-chloridum.

HYDRARGYRUM CUM CRETA.

Mercury with Chalk.

Mode of Preparation.—Rub 1 ounce of mercury with 2 ounces of prepared chalk in a porcelain mortar until metallic globules of mercury cease to be visible to the naked eye, and the mixture has acquired a uniform grey colour.

Characters.—Mercury with chalk is a light-grey powder, free from grittiness.

Tests.—The preparation is insoluble in water. Hydrochloric acid dissolves the chalk, leaving the mercury in a finely-divided state. The solution formed with hydrochloric acid is not precipitated by the addition of stannous chloride.

Therapeutics.—Grey powder is alterative and laxative. In the treatment of 'grease' in horses it is especially valuable in half-drachm doses, given twice daily with other remedies in the form of a ball. It is also given in indigestion and diarrhœa in calves and foals, in doses of 5 to 15 grains repeated three times daily. It may be given suspended in water or as a powder. As an alterative, grey powder has a beneficial action on dogs.

Posology:—

Horses	... 1 drachm.
Calves and foals ...	... 5 to 15 grains.
Dogs	... 3 to 10 grains.

HYOSCYAMI FOLIA.

Henbane Leaves.

Natural Order.—Atropaceæ.

Description.—The fresh leaves and flowers, with the branches to which they are attached, of Hyoscyamus niger, or Henbane; and also the leaves separated from the branches, and flowering tops, carefully dried. They should be collected from biennial plants, growing wild or cultivated in Britain, when about two-thirds of the flowers are expanded.

The *leaves* vary in length, sometimes being as much as 10 inches long. When fresh they are green. They may be with or without a stalk. They are alternate, exstipulate, triangular-ovate, or ovate-oblong, acute, undulated, irregularly toothed, sinuated or pinnatifid, pale green, and glandular-hairy, particularly on their under surface.

The *branches* are sub-cylindrical, and also glandular-hairy. The fresh herb has a strong unpleasant odour, and a bitter and slightly acrid taste, which nearly disappears during the process of drying. The fresh juice dropped into the eye dilates the pupil.

The *seeds* are very small and brown, and are sometimes employed medicinally.

Composition.—All parts of the plant contain *Hyoscyamine*, a volatile alkaloid, which is isomeric with *Atropine*, but not identical with it. An acid, probably *malic*, and a volatile principle are also present.

Preparations :—

Extractum Hyoscyami.
Succus Hyoscyami.
Tinctura Hyoscyami ($2\frac{1}{2}$ ounces to 1 pint).

Therapeutics.—The properties of hyoscyamus and its uses are very similar to those of belladonna, but its prepara-

tions are not so strong as those of the latter drug. Hyoscyamus has a more soothing effect on the brain than belladonna. It has also laxative and carminative effects on the bowels, and a more decided remote action on the urinary organs than the latter.

Rabbits and pigeons, which are very tolerant of atropine, are readily acted upon by a few doses of hyoscyamine.

Hyoscyamus is given with drastic purgatives in canine practice, as it prevents the griping effect. As an anti-spasmodic the tincture is often given to dogs with distemper.

The preparations used are the tincture, succus, extract, and the alkaloid hyoscyamine.

Posology :—

Succus.

Horses and cattle ...	... ½ ounce.
Sheep and pigs ...	... ½ drachm.
Dogs	... 15 minims.

Tincture.

Horses and cattle ...	... 2 to 3 ounces.
Dogs	... 1 drachm.

Extract.

Horses and cattle ...	... 1 drachm.
Sheep and pigs ...	... 5 to 10 grains.
Dogs	... 2 to 5 grains.

Hyoscyamine.

Horses	... 1 grain.

INFUSUM ERGOTÆ.

Infusion of Ergot.

Mode of Preparation.—Infuse 1 part of crushed ergot in 40 fluid parts of boiling distilled water in a covered vessel for half an hour, and strain.

Posology :—

Horses	...	...	... 8 ounces.
Cattle	...	...	... 10 ounces.
Sheep	...	...	... 5 to 6 ounces.
Pigs	...	...	... 2 to 4 ounces.
Dogs	...	...	... ½ to 1 ounce.

INFUSUM LINI.

Infusion of Linseed.

Mode of Preparation.—Infuse 1 part of linseed in 20 fluid parts of boiling distilled water in a covered vessel for two hours, and strain.

Posology :—

Dose ad libitum.

INJECTIO APOMORPHINÆ HYPODERMICA.

Hypodermic Injection of Apomorphine.

Mode of Preparation.—Dissolve 2 grains of hydrochlorate of apomorphine in 100 minims of camphor water, and filter. The solution should be freshly-made.

Therapeutics.—Apomorphine is an efficient emetic in dogs, and is the most useful agent we possess in cases of poisoning in these animals, where it is desired to produce immediate vomiting.

The dose for the dog of the injection of apomorphine administered hypodermically is 5 minims.

INJECTIO ERGOTINI HYPODERMICA.

Hypodermic Injection of Ergotine.

Mode of Preparation.—Dissolve 1 part of ergotin in 2 fluid parts of camphor water by stirring them together. The solution should be freshly made.

Posology :—

Horses ...	... 20 minims.
Cattle ...	... 40 minims to 1 drachm.

INJECTIO MORPHINÆ HYPODERMICA.

Hypodermic Injection of Morphine.

Composition.—The hypodermic injection of morphine is a solution of acetate of morphine, containing one grain of the acetate in each ten minims.

Mode of Preparation.—Dissolve 92 grains of hydrochlorate of morphine in 2 ounces of distilled water, by the aid of gentle heat. Then add sufficient solution of ammonia to precipitate the morphine and render the liquid slightly alkaline. Allow it to cool, collect the precipitate on a filter, wash it with distilled water, and, after the water has drained away, transfer it to a small porcelain dish with about an ounce of distilled water. Heat gently, and carefully add acetic acid until the morphine is dissolved, and a very slightly acid solution is formed. Add sufficient distilled water to make the solution measure exactly 2 fluid ounces. Filter and preserve the product in a stoppered bottle kept away from the light.

Characters.—The hypodermic injection of morphine is a clear solution free from any solid particles.

Tests.—It is very slightly acid.

Posology :—

Horses and cattle	... 30 to 60 minims.
Sheep and pigs	... 3 to 6 minims.
Dogs	... 1 minim.

IODOFORMUM.

Iodoform.

Formula.—CHI_3.

Description.—Iodoform, a compound bearing the same relation to iodine that chloroform does to chlorine, is a pro-

duct of the action of iodine on a mixture of alcohol and solution of carbonate of potassium. It exists in the form of shining, lemon-yellow, crystalline scales, which are somewhat greasy to the touch. It possesses a characteristic, persistent, and disagreeable odour and flavour.

Tests.—Iodoform is very slightly soluble in cold water, more soluble in rectified spirit, soluble in chloroform or ether, readily and entirely soluble in warm ether. The solutions are neutral in reaction. When heated it first melts, forming a brown liquid, then it gives off brown and violet vapours, leaving a black residue, which entirely disappears on continued ignition. If iodoform is warmed with an alcoholic solution of hydrate of potassium, and the resulting fluid is acidified by nitric acid, iodine is liberated, the mixture acquiring a brown colour, or when cold a blue colour on the addition of mucilage of starch.

Preparation.—Unguentum Iodoformi (1 part in 10).

Therapeutics.—Iodoform has powerful antiseptic as well as slight anæsthetic properties. Unlike iodine, it is not irritant when taken internally or locally applied. Externally it has been much used of late in veterinary practice. The ointment is especially valuable as an antiseptic for ulcerated or foul sores. A good antiseptic ointment for dressing wounds is made of iodoform, 20 grains; oil of eucalyptus, 30 minims; carbolic acid, 30 minims; vaseline or lard, 1½ ounces. The powdered iodoform may be dusted on raw indolent ulcers, and for thrush in the horse's foot it may be mixed with equal parts of calomel. A mixture of equal parts of iodoform and calomel is also useful as an insufflation for chronic nasal catarrh in horses, being antiseptic and mildly caustic. About 1 drachm may be injected every day by means of a nasal insufflator. Internally iodoform has been given to beasts suffering from actinomycosis, and the results are said to be satisfactory.

IODUM.

Iodine.

Symbol and Atomic Weight.—I = 126·53.

Description.—Iodine is an element obtained from the ashes of sea-weeds, and from mineral iodides and iodates. It exists in the form of laminar crystals which emit a peculiar odour. They are dark, possess a metallic lustre, and, when heated, yield a beautiful violet-coloured vapour.

Tests.—Iodine is very sparingly soluble in water, but freely dissolved by alcohol, by ether, and by a solution of iodide of potassium. The aqueous solution gives with starch a deep-blue colour. Iodine sublimes without leaving any residue, and the portion that first comes over ought not to include any slender colourless prisms emitting a pungent odour.

Preparations :—

Arsenii Iodidum.
Hydrargyri Iodidum Rubrum.
Iodoformum.
Linimentum Iodi.
Linimentum Potassii Iodidi cum Sapone.
Liquor Iodi.
Potassii Iodidum.
Sodii Iodidum.
Sulphuris Iodidum.
Syrupus Ferri Iodidi.
Tinctura Iodi.
Unguentum Iodi.
Unguentum Iodoformi.
Unguentum Sulphuris Iodidi.
Vapor Iodi.

Therapeutics.—Free iodine taken internally has a local irritant effect on the alimentary canal, and for this reason it is generally preferable to employ the potassium or sodium

iodide for internal purposes. Iodine is quickly absorbed into the blood as sodium iodide. It then speedily passes into the tissues, soon again leaving them. In its passage through them it accelerates tissue change. The lymphatic glands are reduced in size by its internal or external exhibition, and for this reason it is used for the purpose of reducing glandular enlargements, especially those of a scrofulous character. In the treatment of glanders iodine is said to have proved of great value, probably acting by eliminating the germs of the disease from the system. Lead and mercury are combined with by iodide of potassium, and in this way may be eliminated from the system in which they have accumulated. In subacute and chronic inflammations, more especially in effusion or exudation into synovial or serous cavities, the salts of iodine have a beneficial effect in promoting absorption. Externally the application of iodine may be simultaneously used. Iodine is speedily excreted in the urine, the mucous secretions, especially those of the respiratory passages, the saliva, bile, milk, and perspiration. Iodine has a stimulating expectorant effect on the mucous membrane of the respiratory channel, caused by its excretion by this surface. A similar effect is produced by its inhalation.

Externally applied iodine is powerfully irritant and vesicant, antiseptic and disinfectant. When applied locally it is speedily absorbed into the blood by the skin, and in the form of vapour by the respiratory mucous surfaces.

Iodine is given internally in cases of diabetes insipidus in horses. In this disease the iodide has proved of no value, whereas marked curative properties are possessed by pure iodine in doses of 20 to 30 grains, administered once or twice daily until 6 or 8 doses are given. In the hands of many eminent men this treatment has been found of great value, and is probably preferable to any other. In

chronic serous effusions into the pleural or peritoneal cavity, iodine aids the absorption of the fluid. For this purpose it may be used both internally and externally. In scrofulous or other glandular enlargements, in disease of the mesenteric glands, in scrofulous or other enlargements of the joints, it is of great value. In the treatment of chronic bronchitis, it is often beneficial in easing the cough in horses and producing a healthier state of the mucous membrane. With this view it is given internally or by inhalation.

Externally iodine is very destructive to the fungi of ringworm, and the ointment is often employed for this purpose. As counter-irritants for the reduction of enlargements of glands, joints, bursæ, iodine applications are largely employed. The tincture is not strong enough for this purpose, but the strength can readily be increased.

Posology:—

Horses	...	... 20 to 30 grains.
Cattle	...	... ½ to 1 drachm.
Sheep	...	... 10 to 15 grains.
Pigs	...	... 5 to 10 grains.
Dogs	...	... 1 to 2 grains.

IPECACUANHA.

Ipecacuanha.

Natural Order.—Cinchonaceæ.

Description.—The dried root of Cephaëlis Ipecacuanha exists in the form of more or less twisted pieces, usually from 2 to 4 inches long, and about the size of a small lead pencil. It consists of two parts, namely, a central inert whitish woody axis, and a thick cortical or active portion, which is brownish, greyish-brown, or reddish-brown, irregularly annulated, and having a resinous or waxy fracture. The taste is somewhat acrid and bitter, the odour slight, peculiar, and especially marked when the root is powdered.

Preparations :—

Pulvis Ipecacuanhæ Compositus (1 part in 10).
Vinum Ipecacuanhæ.

Therapeutics.—Ipecacuanha has not been much used in veterinary practice, excepting for the dog. It is a gastric stimulant, in large doses acting as an emetic on the dog. On the intestines it is also stimulant, and in large doses irritant. On the skin it has a diaphoretic action. It also has sedative, expectorant, and direct cholagogue properties. As an emetic, when a quick action is not necessary, ipecacuanha is prescribed for cats and dogs. For this purpose it is chiefly useful in the early stages of catarrh and in cutting short inflammatory attacks, especially of the eyes, brain, and air-passages. It is given in horses in mucous catarrh, and as a sedative expectorant with other remedies in dry cough. In dysentery it may be prescribed as Dover's powder, or alone. In this disease it has a very beneficial effect in the human subject, being regarded as a specific in this disease.

Posology :—

As an emetic.

Dogs	...	... 15 to 30 grains.
Cats	...	... 5 to 10 grains.
Pigs	...	... 20 to 30 grains.

As an expectorant.

Horses	...	... 1 to 2 drachms.

In dysentery.

Horses	...	... 2 to 4 drachms.

Of Dover's powder.

Horses and cattle		... 2 to 4 drachms.
Sheep	...	... ½ to 1 drachm
Dogs	...	... 10 to 15 grains.
Cats	...	... 2 to 5 grains.

JABORANDI.

Jaborandi.

Synonym.—Pilocarpi Foliola.

Natural Order.—Rutaceæ.

Description.—The leaflets of Pilocarpus pennatifolius, which should be dried before being used, are very shortly stalked, usually 4 inches or more in length, oval-oblong or oblong-lanceolate, slightly unequal at the base, obtuse, and emarginate, somewhat revolute and entire at the margins, coriaceous. The upper surface is glabrous, and, except when young, dull green. The under surface is paler, often somewhat hairy, with a very prominent midrib, and marked irregularly all over with pellucid dots when held against the light. The odour, when bruised, is slightly aromatic. The taste, when the leaves are chewed, is slightly bitter and aromatic at first, but subsequently pungent and increasing the flow of saliva.

Preparations :—

Extractum Jaborandi.
Pilocarpinæ Nitras.
Tinctura Jaborandi.

Therapeutics.—Jaborandi leaves and the alkaloid are sudorific, sialogogue, and antipyretic. The alkaloid enters the blood quickly, causing profuse salivation, perspiration, disturbance of vision, and circulatory depression. The motor centres are paralysed and the arterioles dilated. Poisonous doses arrest the heart's action in diastole. Pilocarpin resembles muscarin in action, and is antagonized by atropine. It should be remarked that the profuse perspiration so marked in man is not so great in horses and dogs. In veterinary practice, jaborandi has been given for promoting the absorption of pleuritic and other effusions, and

also in eczema and prurigo. In azoturia in horses the hypodermic injection of pilocarpin is believed to be beneficial. In albuminuria in horses it is also recommended.

Posology :—

Horses and cattle	... 2 to 4 drachms of the leaves.
Sheep, pigs, and dogs	... $\frac{1}{2}$ to 1 drachm.

JALAPA.

Jalap.

Natural Order.—Convolvulaceæ.

Description.—The dried tubercles of Ipomæa Purga. They should be irregularly oblong, somewhat ovoid, napiform, or rarely fusiform, hard, compact, and vary in size from half an inch to 3 or 4 inches in diameter, from that of a nut to that of an orange. The larger are frequently incised, or cut into halves or quarters. Externally they are dark-brown, and more or less irregularly furrowed and wrinkled, and marked with paler transverse lines or scars. Internally the colour is dirty-yellow or brownish, and they are marked with dark-brown irregular concentric circles. The odour is faint, peculiar, and smoky, and is increased by rubbing or powdering. The taste is sweet, acrid, and nauseous. Not less than 10 per cent. by weight of resin should be capable of being obtained from it, and of this not more than one-tenth should be soluble in ether.

Therapeutics.—Jalap closely resembles scammony in its action. It has a powerful hydragogue cathartic action on pigs, cats and dogs, as in the human subject, but its action on horses and cattle is small. It only purges when in the presence of the duodenal secretions. Jalap is a powerful stimulant of the intestinal secretions, and is especially adapted for use in dogs and pigs as a purgative. It may be

conveniently prescribed with calomel. As a purge after the administration of anthelmintics, jalap is very suitable, possessing itself some vermicidal properties.

Posology :—

Dogs	...	... ½ to 2 drachms.
Pigs	...	... 1 to 4 drachms.
Cats	...	... 20 to 30 grains.

KAMALA.

Kamala.

Description.—Kamala is a powder, which consists of the minute glands and hairs obtained from the surface of the fruits of Mallotus philippinensis. It is a fine granular mobile powder, of a brick-red or madder colour, and is nearly tasteless and odourless. Water has scarcely any effect upon it, even when boiling, but it forms deep red solutions with alcohol, ether, or chloroform. When examined by the microscope it is seen to consist of irregular, spherical, flattened or depressed garnet-red glands with wavy surfaces, mixed with nearly colourless thick-walled stellate hairs. If ignited in the air, it should yield 4 or 5 or at most 10 per cent. of ash.

Therapeutics.—Kamala is an anthelmintic. It has as yet been very little used in veterinary practice, but is very destructive to tape-worms as well as to round worms in dogs.

Posology :—

Horse	...	... 1 to 2 ounces.
Dog	...	... 1 to 3 drachms.

KINO.

Kino.

Description.—Kino is the juice obtained from incisions made in the trunk of Pterocarpus Marsupium, inspissated without the aid of artificial heat. It exists in small, angular, glistening, opaque, reddish-black, brittle fragments, which in thin laminæ and at the edges are transparent and ruby-red. They are inodorous and very astringent, and when chewed stick to the teeth and tinge the saliva blood-red. Kino is almost entirely soluble in rectified spirit, and yields little or nothing to ether.

Therapeutics.—Kino has properties very similar to those of tannic acid, and may be used for the same purposes. It is used especially as a constituent of mixtures for diarrhœa, but is less powerful than catechu.

Posology.—The dose of kino is about the same as that of catechu.

LAMELLÆ ATROPINÆ.

Discs of Atropine.

These are prepared from gelatine and some glycerine, weigh about $\frac{1}{50}$ grain, and contain $\frac{1}{5000}$ grain of sulphate of atropine.

LAMELLÆ COCAINÆ.

Discs of Cocaine.

These are discs of gelatine with some glycerine, weigh about $\frac{1}{50}$ grain, and contain $\frac{1}{200}$ grain of hydrochlorate of cocaine.

LAMELLÆ PHYSOSTIGMINÆ.

Discs of Physostigmine.

These are discs of gelatine with some glycerine, weigh about $\frac{1}{50}$ grain, and contain $\frac{1}{1000}$ grain of physostigmine.

LINI FARINA.

Linseed Meal.

Linseed reduced to powder.

Preparations :—

Cataplasma Carbonis.
Cataplasma Furfuris.
Cataplasma Lini.
Cataplasma Sinapis.
Cataplasma Sodæ Chlorinatæ.

LINI SEMINA.

Linseed.

Natural Order.—Linaceæ.

Description.—The dried ripe seeds of Linum usitatissimum vary in length from one-sixth to one-fourth of an inch, are rather flat, ovoid, somewhat obliquely pointed, brown, smooth, shining on their outer surface, internally yellowish-white, odourless. They possess a mucilaginous oily taste.

Tests.—A decoction of linseed should not give a blue colour with solution of iodine.

Preparations :—

Farina Lini.
Infusum Lini.
Oleum Lini.

Therapeutics.—Externally, linseed meal is used in the form of a poultice (cataplasma lini), which is employed to convey heat and moisture. It is also used in the preparation of poultices of chlorinated lime, charcoal, and mustard. Bruised linseed mixed with an equal quantity of bran is a very convenient application for many purposes.

Infusion of linseed and linseed gruel are given as demulcent drinks in cases of irritation of the pharynx and fauces, alimentary canal, bladder, and kidneys. They also form suitable media for the administration of many medicines, and likewise prove beneficial in cases of poisoning by irritant substances. Linseed has a slight diuretic action.

The therapeutics of linseed oil will be treated of under oleum lini.

LINIMENTUM ACONITI.

Liniment of Aconite.

Mode of Preparation.—Take of

Aconite Root, in No. 40 powder, 20 ounces.
Camphor, 1 ounce.
Rectified Spirit, a sufficient quantity to make 30 fluid ounces.

Mix the aconite with 20 fluid ounces of the spirit, and macerate in a closed vessel for three days, with occasional agitation. Transfer to a percolator, and when the liquor ceases to pass, continue the percolation with more of the spirit, allowing the liquor to drop into a receiver which contains the camphor, until the product measures 30 fluid ounces.

LINIMENTUM ACETICUM.

Acetic Liniment.

Mode of Preparation.—Mix together the contents of 4 eggs, 4 fluid ounces of acetic acid, 4 fluid ounces of solution of acetate of lead, $\frac{1}{2}$ ounce of oil of rosemary, 8 ounces of oil of turpentine, and water to make 2 quarts.

LINIMENTUM ACETICUM CUM POTASSII IODIDO.

Acetic Liniment with Iodide of Potassium.

Mode of Preparation.—Add to 8 fluid ounces of acetic liniment 2 ounces of iodide of potassium.

LINIMENTUM AMMONIÆ.

Liniment of Ammonia.

Mode of Preparation.—Take of

Solution of Ammonia, 1 fluid ounce.
Olive Oil, 3 fluid ounces.

Mix with agitation until the thick emulsion at first produced becomes of such consistence that it can be poured from a bottle.

LINIMENTUM AMMONIÆ COMPOSITUM.

Compound Ammonia Liniment.

Mode of Preparation.—Mix together 2 pints of proof spirit, $\frac{1}{2}$ pint of strong solution of ammonia, 4 ounces of soft soap, and 1 ounce of camphor.

LINIMENTUM BELLADONNÆ.

Liniment of Belladonna.

Mode of Preparation.—Mix 20 ounces of belladonna root with 20 fluid ounces of rectified spirit. Macerate in a closed vessel, frequently agitating, for 3 days. Transfer to a percolator, and when the liquor ceases to pass, continue the percolation with more rectified spirit, allowing the liquor to drop into a receiver which contains 1 ounce of camphor. Use sufficient spirit to make the product measure 30 fluid ounces.

LINIMENTUM CALCIS.

Liniment of Lime.

Mode of Preparation.—Mix thoroughly 1 fluid part of solution of lime with 1 fluid part of olive oil.

LINIMENTUM CAMPHORÆ.

Liniment of Camphor.

Mode of Preparation.—Dissolve 1 part of camphor in 4 fluid parts of olive oil.

Preparations:—

Linimentum Chloroformi, 1 volume in 2.
Linimentum Hydrargyri.
Linimentum Terebinthinæ Aceticum, 4 volumes in 9.

LINIMENTUM CAMPHORÆ COMPOSITUM.

Compound Liniment of Camphor.

Mode of Preparation.—Dissolve 20 parts of camphor and 1 fluid part of oil of lavender in 120 fluid parts of rectified spirit, add gradually 40 fluid parts of strong solution of ammonia, shaking them together until a clear solution is formed.

LINIMENTUM CANTHARIDUM.

Liniment of Cantharides.

A. Digest 1 part of powdered cantharides with 8 fluid parts of olive oil over a hot bath.

B. (Liquor Epispasticus of the B. P.). Mix 5 ounces of powdered cantharides with 3 fluid ounces of acetic ether. Pack in a percolator; at the expiration of 24 hours pour a sufficient quantity of acetic ether over the contents of the percolator, and allow the solution to pass slowly through until 20 fluid ounces are obtained. Keep the liquid in a stoppered bottle.

LINIMENTUM CHLOROFORMI.

Liniment of Chloroform.

Mode of Preparation.—Mix 1 fluid part of chloroform with 1 fluid part of liniment of camphor.

LINIMENTUM CROTONIS.

Liniment of Croton Oil.

Mode of Preparation.—Mix together 2 fluid parts of croton oil, 7 fluid parts of oil of Cajuput, and 7 fluid parts of rectified spirit.

LINIMENTUM HYDRARGYRI.

Liniment of Mercury.

Mode of Preparation.—Mix 1 fluid part of solution of ammonia with $\frac{1}{2}$ fluid part of liniment of camphor; rub 1 part of ointment of mercury with another $\frac{1}{2}$ fluid part of liniment of camphor; and mix the two mixtures together.

LINIMENTUM HYDRARGYRI PERCHLORIDI.

Liniment of Perchloride of Mercury.

Mode of Preparation.—Add 40 grains of perchloride of mercury to 1 fluid ounce of methylated spirit. Colour with alkanet.

Use.—This strong absorbent blistering application should be painted on the part with a brush. It is especially useful in reducing bony enlargements.

LINIMENTUM IODI.

Liniment of Iodine.

Mode of Preparation.—Dissolve $2\frac{1}{2}$ parts of iodine, 1 part of iodide of potassium, and $\frac{1}{2}$ part of camphor in 20 fluid parts of rectified spirit or methylated spirit.

Use.—This absorbent blistering liniment should be painted by means of a brush on the part to be blistered.

LINIMENTUM OPII.

Liniment of Opium.

Mode of Preparation.—Mix together 1 fluid part of tincture of opium and 1 fluid part of liniment of turpentine, and filter.

LINIMENTUM SINAPIS.

Liniment of Mustard.

Mode of Preparation.—Mix together 4 ounces of mustard and 5 fluid ounces of oil of turpentine. Digest for ten days, and add about 4 fluid ounces of linseed oil.

LINIMENTUM SINAPIS COMPOSITUM.

Compound Liniment of Mustard.

Mode of Preparation.—Dissolve 1 part of ethereal extract of mezereon and 3 parts of camphor in 44 fluid parts of rectified spirit, and add 1·4 fluid part of oil of mustard and 7 fluid parts of castor oil.

LINIMENTUM TEREBINTHINÆ.

Liniment of Turpentine.

Mode of Preparation.—Mix 2 parts of soft soap with 2 fluid parts of distilled water. Dissolve 1 part of camphor in 16 fluid parts of oil of turpentine. Finally rub the two fluids together until they are thoroughly mixed.

LINIMENTUM TEREBINTHINÆ ACETICUM.

Liniment of Turpentine and Acetic Acid.

Mode of Preparation.—Mix 4 fluid parts of oil of turpentine, 1 part of glacial acetic acid, and 4 fluid parts of liniment of camphor.

LIQUOR ACIDI CHROMICI.

Solution of Chromic Acid.

Composition.—Solution of chromic acid is composed of 25 per cent. of chromic anhydride, CrO_3, or 29·5 per cent. of real chromic acid, H_2CrO_4.

Mode of Preparation.—Dissolve 1 part of chromic anhydride in 3 fluid parts of distilled water.

Characters.—Solution of chromic acid is orange-red, inodorous, caustic and strongly acid, and has a specific gravity of 1·185. One fluid drachm contains the equivalent of nearly 18 grains of chromic anhydride, CrO_3.

Therapeutics.—Chromic acid has powerful oxidizing properties, and is a potent caustic. Its deodorant and disinfectant action is also of a marked character.

The solution is recommended as a local application for the so-called 'grapes' in horses, and may be employed in the full strength or diluted with equal parts of water. When diluted with 12 parts of water, it is serviceable in ulcerated conditions of the mouth and tongue.

LIQUOR AMMONIÆ.

Solution of Ammonia.

Mode of Preparation.—Mix together 1 fluid part of strong solution of ammonia and 2 fluid parts of distilled water, and preserve in a stoppered bottle.

Characters.—The specific gravity is 0·959. One fluid drachm contains 5·2 grains of the gas ammonia.

Preparation.—Linimentum Ammoniæ.

Therapeutics.—Applied externally, solution of ammonia has counter-irritant and rubefacient properties. It is employed in the preparation of Linimentum Ammoniæ.

Internally solution of ammonia has stimulant, antispas-

modic, antacid, and diuretic properties. It stimulates the central nervous system, more especially acting upon the cord and the respiratory centre. On the heart it has a powerful stimulant action, increasing the number of the beats of the pulse and raising the blood-pressure.

In cases of chronic bronchitis, more especially when associated with debility; in congestion of the lungs of the active type; in pneumonia, especially when the heart's action is feeble, it is of great value. As a general stimulant it is indicated in debilitated conditions of the system. In influenza, strangles, and other weakening fevers it is commonly prescribed. In cases of serpents' bites it is tried in most instances, in order to sustain the vital energies until the poison has time to be thrown off by the excretory organs.

On the stomach it acts as a carminative and reflex general stimulant, and it produces antacid effects on the contents. It is therefore useful in cases of indigestion and tympanitis. In poisoning by hellebore, opium, bryony, or other powerful depressors, it is of great efficacy.

In spasmodic and flatulent colic it is often given, controlling the spasms in the former and dispelling the gaseous accumulations in the latter.

Posology:—

Horses	... ½ to 1 fluid ounce.
Cattle ...	... 1 to 2 fluid ounces.
Sheep ...	... 1 to 2 fluid drachms.
Pigs ...	... 1 to 2 fluid drachms.
Dogs ...	... 5 to 15 minims.

Solution of ammonia should be given freely diluted with cold mucilage, gruel, or water.

LIQUOR AMMONIÆ FORTIS.

Strong Solution of Ammonia.

Composition.—Strong solution of ammonia consists of the gas ammonia dissolved in water to the extent of 32·5 per cent. of the solution.

Mode of Preparation.—The gas ammonia may be obtained by acting on chloride of ammonium with slaked lime, and the solution by passing the gas into distilled water.

Characters.—Strong solution of ammonia is a colourless liquid with a characteristic and very pungent odour, and a strong alkaline reaction. The specific gravity is 0·891. One fluid drachm contains 15·83 grains of ammonia gas. When diluted with four times its volume of distilled water, it does not give precipitates with solution of lime, oxalate of ammonium, sulphydrate of ammonium, or ammonio-sulphate of copper; and, when treated with an excess of nitric acid, it is not rendered turbid by nitrate of silver or by chloride of barium.

Preparations:—

Ammonii Phosphas.
Linimentum Ammoniæ Compositum.
Linimentum Camphoræ Compositum.
Liquor Ammoniæ.
Spiritus Ammoniæ Aromaticus.

Therapeutics.—Strong solution of ammonia is a little more than three times the strength of the foregoing preparation. It is used in the preparation of the compound liniment of ammonia, and in that of the compound liniment of camphor. It is not to be recommended for internal purposes, the previous preparation being preferable.

LIQUOR AMMONII ACETATIS.

Solution of Acetate of Ammonium.

Chemical Composition. — Acetate of ammonium, the formula of which is $NH_4C_2H_3O_2$, dissolved in water.

Mode of Preparation.—One fluid part of strong solution of acetate of ammonium must be mixed with 5 fluid parts of distilled water, and the solution should be stored in bottles free from lead. The specific gravity is 1·022.

Therapeutics.—Acetate of ammonium is prescribed in fever, in virtue of its marked stimulant action on the skin. It is indeed a reliable diaphoretic. It does not possess the general stimulant action of the solution of ammonia or of the carbonate of ammonium; but it is a diuretic as well as a diaphoretic. In the treatment of diseases attended by fever, such as influenza, scarlet fever, chill, inflammatory conditions of the respiratory tract, it is one of the most commonly prescribed of all veterinary medicines.

Posology :—

Horses ...	... 2 to 4 fluid ounces.
Cattle ...	... 2 to 4 fluid ounces.
Sheep and pigs	... ½ to 1 ounce.
Dogs ...	... 2 to 4 fluid drachms.

LIQUOR AMMONII ACETATIS FORTIS.

Strong Solution of Acetate of Ammonium.

Mode of Preparation.—Crush 15½ ounces of carbonate of ammonium, and add it gradually to about 45 fluid ounces of acetic acid. Then add more of the acid until a neutral liquid results, and lastly add sufficient distilled water to yield 3 pints. The solution should be stored in bottles free from lead.

Characters.—A little of the solution, heated in a test-tube to expel carbonic acid gas, should be neutral. The specific gravity is 1·073.

Preparation.—Liquor Ammonii Acetatis.

Therapeutics.—The strong solution of acetate of ammonium is nearly five times as strong as the foregoing preparation, and is administered for the same purposes in doses proportionately reduced.

LIQUOR ANTIMONII CHLORIDI.

Solution of Chloride of Antimony.

Mode of Preparation.—Place 1 pound of purified black antimony in a porcelain vessel, pour upon it 4 pints of hydrochloric acid, and, constantly stirring, heat gently, gradually augmenting the heat as the evolution of gas becomes slower, until the liquid boils. Continue to maintain this temperature for fifteen minutes. Remove the mixture from the source of heat, and filter the liquid through calico into another vessel, returning what passes through first, in order that a perfectly clear solution may be obtained. Boil this down to the bulk of 2 pints, and preserve in a stoppered bottle.

Characters.—Solution of chloride of antimony is a heavy liquid usually of a yellowish-red colour, and has a specific gravity of about 1·47.

Tests.—A little of it dropped into water gives a white precipitate, and the filtered solution lets fall a copious deposit on the addition of nitrate of silver. If the white precipitate formed by water be treated with sulphuretted hydrogen, it becomes orange-coloured.

Preparation.—Antimonii Oxidum.

Therapeutics.—Solution of chloride of antimony was formerly much used as a caustic in the treatment of thrush,

canker, and foot-rot, being either employed alone or mixed with 1 or 2 more parts of compound tincture of myrrh. It is not so commonly used now, though for fistulous cavities and sinuses it proves a painless and efficient caustic. It cannot be diluted with water without undergoing decomposition.

LIQUOR ARSENICALIS.

Arsenical Solution.

Synonym.—Fowler's Solution.

Mode of Preparation.—Place 87 grains of arsenious anhydride in powder and the same quantity of carbonate of potassium in a flask with 10 ounces of distilled water, and apply heat until a clear solution is obtained. Allow it to cool, and then add as much distilled water as will make 1 pint.

Character. — Arsenical solution is a clear colourless liquid, alkaline in reaction.

The solution contains 1 per cent. of arsenious anhydride, each fluid ounce containing therefore $4\frac{1}{3}$ grains.

Tests.—After being acidulated with hydrochloric acid it gives with sulphuretted hydrogen a yellow precipitate, which is brightest when the arsenical solution has been previously diluted.

Therapeutics.—Liquor arsenicalis is the form in which it is generally customary to administer arsenious oxide. The oxide when not given in solution is too irritating for internal administration (see Oxidum Arseniosum). The liquor is not uncommonly also used for external purposes, more especially for the destruction of pediculi and acari, but it is advisable to use preparations for these purposes, which, while being far less dangerous to the animal, are not less destructive to the parasites.

Posology:—

Horses and cattle	... 2 fluid drachms to 1 fluid ounce.
Sheep and pigs	... ½ to 1 fluid drachm.
Dogs ...	... 4 to 8 minims.

LIQUOR ARSENII ET HYDRARGYRI IODIDI.

Solution of Iodide of Arsenic and Mercury.

Synonym.—Donovan's Solution.

Mode of Preparation.—Triturate 45 grains of iodide of arsenic and 45 grains of red iodide of mercury with 1½ ounces of distilled water, until nearly all is dissolved. Pass firstly the solution through a filter, and then pour on the filter as much water as will produce 10 fluid ounces of filtrate in all.

Characters.—Solution of iodide of arsenic and mercury is a clear pale yellow liquid, and possesses a metallic flavour. The specific gravity is 1·016.

Tests.—If sulphuretted hydrogen is added, a precipitate partially insoluble in strong nitric acid is produced; while the dissolved part, when diluted, yields a yellow precipitate on the gradual addition of solution of sulphydrate of ammonium.

One fluid ounce contains about 1 per cent. by weight of arsenious iodide, AsI_3, and of mercuric iodide, HgI_2.

Therapeutics.—Donovan's solution is given when it is required to produce the combined action of mercury, iodine, and arsenic.

It is a valuable preparation, but is not much used. In many forms of chronic skin disease it is of great efficacy.

Posology:—

Horse ...	... ½ to 1 fluid ounce.

LIQUOR ARSENII HYDROCHLORICUS.

Hydrochloric Solution of Arsenic.

Mode of Preparation.—Boil 87 grains of arsenious anhydride in powder with 2 fluid drachms of hydrochloric acid and 4 fluid ounces of distilled water until it is dissolved. Then add distilled water to make 1 pint.

Characters.—Hydrochloric solution of arsenic is a colourless liquid, having an acid reaction. The specific gravity is 1·01. The solution contains 1 per cent. of arsenious anhydride, each fluid ounce containing $4\frac{1}{3}$ grains.

Test.—Sulphuretted hydrogen produces at once, when mixed with it, a yellow precipitate.

Therapeutics and Posology.—The uses and the doses of this preparation are the same as those of the liquor arsenicalis.

LIQUOR ATROPINÆ SULPHATIS.

Solution of Sulphate of Atropine.

Mode of Preparation.—Dissolve 1 part of sulphate of atropine in 99 fluid parts of camphor water.

Therapeutics.—See Atropina.

Solution of sulphate of atropine is a convenient form in which to administer atropine by the mouth or hypodermically.

Posology:—

By the Mouth.

Horses and cattle	... 1 to 2 fluid drachms.
Sheep ...	... 12 minims.
Dogs ...	... 4 to 5 minims.

Hypodermically.

One-fifth of the above doses suffices when the medicine is given hypodermically.

LIQUOR BISMUTHI ET AMMONII CITRATIS.

Solution of Citrate of Bismuth and Ammonium.

Mode of Preparation.—Rub 800 grains of the citrate of bismuth to a paste with a little distilled water, and add a little solution of ammonia gradually and with stirring, until the salt is just dissolved. Dilute with distilled water to form 1 pint.

Characters.—Solution of citrate of bismuth and ammonium is colourless, and has a slightly metallic taste. One fluid drachm contains an amount of bismuth equivalent to about 3 grains of oxide of bismuth. The specific gravity is 1·07.

Tests.—It is neutral or slightly alkaline in reaction, and freely miscible with water. When heated with alkalies it evolves ammonia gas, and yields a white precipitate. If the salt is evaporated to dryness and the residue is ignited, a charred mass with a yellow edge results, and if this is treated with nitric acid a solution free from impurities should result.

Preparation.—Bismuthi et Ammonii Citras.

Therapeutics.—Solution of citrate of bismuth and ammonium is a useful remedy in cases of chronic indigestion in dogs.

Posology :—

Dogs	...	...	½ to 2 fluid drachms.

LIQUOR CALCIS.

Solution of Lime.

Synonym.—Lime Water.

Mode of Preparation.—Wash 2 ounces of slaked lime with distilled water until a little of the liquid, when filtered and acidified with nitric acid, produces no turbidity with nitrate of silver. Place the washed lime into a stoppered bottle containing 1 gallon of the water, and shake well for

two or three minutes. After twelve hours the excess of lime will have subsided, and the clear solution may be drawn off with a syphon and transferred to a green-glass bottle provided with a well-pressed stopper.

Test.—Ten fluid ounces require for neutralisation 180 grain-measures of the volumetric solution of oxalic acid, and therefore contain about 5 grains of lime, CaO. Nitrate of silver gives no precipitate when added to solution of lime acidified with nitric acid.

Preparations :—

Argenti Oxidum.
Linimentum Calcis.
Lotio Hydrargyri Flava.
Lotio Hydrargyri Nigra.

Therapeutics.—See Calcii Hydras.

Posology :—

Horses and cattle	... 4 to 6 fluid ounces.
Calves ...	... 2 fluid ounces.
Sheep and pigs	... 1 to 2 fluid ounces.
Dogs ...	... 2 fluid drachms to 1 fluid ounce.

LIQUOR CALCIS CHLORINATÆ.

Solution of Chlorinated Lime.

Mode of Preparation.—Mix well 10 parts of distilled water and 1 part of chlorinated lime by trituration in a mortar, and, having poured the mixture into a stoppered bottle, shake it well several times for the space of three hours. Pour out the contents of the bottle on to a calico filter, and preserve the solution which passes through in a stoppered bottle.

Tests.—The specific gravity is about 1·055.

When the solution is made with the best chlorinated lime, and is quite fresh, it may yield about 3 per cent. of

available chlorine. There should always be at least 2 per cent.

Therapeutics.—See Calx Chlorinata, page 118.

Posology:—

Horses	...	... 1 to 2 fluid ounces.
Cattle	...	... 2 to 4 fluid ounces.
Sheep and pigs		... $\frac{1}{2}$ to 1 fluid ounce.
Dogs	...	... $\frac{1}{2}$ to $1\frac{1}{2}$ fluid drachms.

LIQUOR FERRI DIALYSATUS.

Solution of Dialysed Iron.

Chemical Composition.—The solution of dialysed iron is in reality a solution of highly basic ferric oxychloride, or chloroxide of iron, from which most of the acidulous matter has been removed by dialysis.

Mode of Preparation.—Mix 6 fluid ounces of strong solution of perchloride of iron with 2 pints of distilled water, and stir into the mixture sufficient diluted solution of ammonia to impart, after thorough agitation, a distinct ammoniacal odour. Filter through calico, wash the precipitated ferric hydrate with distilled water, and then squeeze it to remove superfluous moisture. Add the precipitate to 1 fluid ounce of solution of perchloride of iron, stir thoroughly, warm gently, and when complete or nearly complete solution is obtained, filter if necessary and place the liquid in a covered dialyser. Then subject it to a stream of water until the solution on the dialyser is almost tasteless. The resulting solution should measure 28 fluid ounces.

Characters and Tests.—Solution of dialysed iron is a clear dark reddish-brown liquid, free from any marked ferruginous taste and acid reaction. The specific gravity is about 1·047. The solution gives no precipitate with ferrocyanide of potassium or with nitrate of silver, thereby indicating the absence of perchloride of iron.

Therapeutics and Posology.—Dialysed iron has been very little employed in veterinary medicine, but it is a very good form for administering iron in dogs, to which it is given in doses of 15 to 30 minims.

LIQUOR FERRI PERCHLORIDI.

Solution of Perchloride of Iron.

Mode of Preparation.—Mix 5 fluid ounces of strong solution of perchloride of iron with 15 fluid ounces of distilled water.

Characters.—Solution of perchloride of iron is of the same strength as the tincture of perchloride of iron. The specific gravity is 1·11.

Therapeutics and Posology.—The uses and doses of the liquor ferri perchloridi are the same as those of the tincture. See Tinctura Ferri Perchloridi.

LIQUOR FERRI PERCHLORIDI FORTIS.

Strong Solution of Perchloride of Iron.

Mode of Preparation.—Place 4 ounces of iron wire in a flask, and add a mixture of 12½ fluid ounces of hydrochloric acid, and 7 of water. Expose the whole to a moderate temperature until effervescence ceases, heat to boiling, filter in order to remove undissolved iron, rinse the flask and contents with a little water, and pour this over the filter, add to the filtrate 7 fluid ounces of hydrochloric acid, and pour the solution slowly and continuously into 1½ fluid ounces of nitric acid, the evolution of red fumes being promoted if necessary by slightly heating. Evaporate the product until no more nitrous fumes escape and a precipitate begins to form, and then add 1 fluid ounce of hydrochloric acid, and sufficient water to produce 17½ fluid ounces of the solution.

Characters and Tests.—Strong solution of perchloride of iron is orange-brown in colour, possesses a strong styptic taste, and is miscible with water and rectified spirit in all proportions. If diluted with water like all chlorides, it gives a white precipitate with nitrate of silver, and a blue one with ferrocyanide of potassium, but none with ferricyanide of potassium. The specific gravity is about 1·42. A piece of copper, boiled for a few minutes in 50 or 100 grains of the solution diluted with water, and then rinsed in water, dried and heated in a dry test-tube, yields no white crystalline sublimate. Two ounces of iron are contained in 10 fluid ounces of the solution.

Preparations :—

Liquor Ferri Dialysatus.
Liquor Ferri Perchloridi.
Tinctura Ferri Perchloridi.

Uses.—The strong solution of perchloride of iron is used in the making of the above three preparations.

LIQUOR HYDRARGYRI NITRATIS ACIDUS.

Acid Solution of Nitrate of Mercury.

Mode of Preparation.—Mix 5 fluid ounces of nitric acid with $1\frac{1}{2}$ fluid ounces of distilled water in a flask, and dissolve 4 ounces of mercury in the mixture without the aid of heat. Boil gently for 15 minutes, cool, and preserve the solution, which should weigh about 12 ounces, in a stoppered bottle away from the light.

Characters and Tests.—Acid solution of nitrate of mercury is colourless and strongly acid, and gives a yellow precipitate with solution of hydrate of potassium added in excess. A crystal of sulphate of iron dropped into it soon acquires a dark-brown colour, as does also the solution in proximity with it. The specific gravity is about 2. A

little of the solution when dropped into hydrochloric acid, diluted with twice its volume of water, gives no precipitate.

Therapeutics.—Acid solution of nitrate of mercury has powerful caustic properties. It is occasionally applied to foul ulcers with the view of promoting healing. As a gargle, 5 minims to 1 ounce of water is useful in aphthous conditions of the mouth and in sore throat. In cases of canker of the horse's foot, where it is desired to destroy the unhealthy growth, the acid solution may be cautiously applied over the diseased part; but the dressing must not be repeated, for some time at any rate. The application may be followed up by the use of strong solutions of carbolic acid or other antiseptics.

Diluted solutions of the acid nitrate of mercury are useful as stimulants in chronic diseases of the skin, and are often employed in eczema after the inflammatory stage is over. They also destroy the fungi of ringworm, and are also useful in killing pediculi.

LIQUOR MORPHINÆ ACETATIS.

Solution of Acetate of Morphine.

Mode of Preparation.—Mix 18 minims of diluted acetic acid, ½ fluid ounce of rectified spirit, and 1½ fluid ounces of distilled water, and dissolve 9 grains of acetate of morphine in the mixture. The acetate of morphine used should be recently prepared, and of such quality that 20 grains will form a clear solution with 1 fluid drachm of water by the help of not more than 1 grain of acetic acid.

Therapeutics.—See Morphinæ Acetas.

Posology:—

Horses and cattle	... 2 to 6 fluid drachms.
Dogs ...	... 5 to 10 minims.

LIQUOR MORPHINÆ HYDROCHLORATIS.

Solution of Hydrochlorate of Morphine.

Mode of Preparation.—Mix 18 minims of diluted hydrochloric acid, ½ fluid ounce of rectified spirit, and 1½ fluid ounces of distilled water, and dissolve 9 grains of hydrochlorate of morphine in the mixture.

Character.—The strength is about 1 per cent.

Posology.—Same as that of the solution of acetate of morphine.

LIQUOR PLUMBI SUBACETATIS.

Solution of Subacetate of Lead.

Synonym.—Goulard's extract.

Chemical Composition.—The above is an aqueous solution of subacetate of lead, $Pb_2O(C_2H_3O_2)_2$.

Mode of Preparation.—Boil 5 ounces of acetate of lead and 3½ ounces of oxide of lead in powder, in 1 pint of distilled water for half an hour, constantly stirring. Filter, and, when the liquid is cold, add to it more distilled water, until the product measures 20 fluid ounces. Keep the clear solution which results in stoppered bottles.

Characters and Tests.—Solution of subacetate of lead is a dense, clear, colourless liquid, possessing an alkaline reaction and a sweet astringent taste. By exposure to the air it becomes turbid. With mucilage of gum acacia, it forms an opaque white jelly. Sulphuric acid in excess gives with it a white precipitate, acetic acid being set free. The specific gravity is 1·275.

Preparation.—Liquor Plumbi Subacetatis Dilutus.

Therapeutics.—Goulard's extract applied locally has astringent, antiphlogistic, and anodyne properties. It is used for bruises, sprains, and blistered surfaces. For sprains and bruises, 1 ounce of Goulard's extract, 1 ounce of spirit with 8 parts of distilled water, is a form in general

use. Another form for such purposes is:—1 ounce of Goulard's extract, 1 ounce of tincture of opium, and 6 ounces of distilled water. Another form is:—1 ounce of Goulard's extract and 4 parts of olive or linseed oil.

LIQUOR PLUMBI SUBACETATIS DILUTUS.

Diluted Solution of Subacetate of Lead.

Synonym.—Goulard's Water.

Mode of Preparation.—Mix 1 fluid part of solution of subacetate of lead and 1 fluid part of rectified spirit with 79 fluid parts of distilled water. Filter through paper, and keep the clear solution in a stoppered bottle.

Therapeutics.—Diluted solution of subacetate of lead has astringent, antiphlogistic, and anodyne properties. It is applied locally for the same purposes as the preceding preparation, the only difference between the two consisting in the lesser proportion of active ingredient.

LIQUOR POTASSII HYDRATIS.

Solution of Hydrate of Potassium.

Synonyms.—Liquor Potassæ, Solution of Potash.

Mode of Preparation.—Dissolve 1 pound of carbonate of potassium in 1 gallon of distilled water. Heat the solution to the boiling-point in a clean iron vessel, and gradually mix with it 12 ounces of washed slaked lime. In order to obtain the 12 ounces of washed slaked lime about 13 ounces of slaked lime must be washed with distilled water until a little of the washings, acidified with nitric acid, gives no cloudiness with nitrate of silver. Continue the ebullition for ten minutes with constant stirring. Remove the vessel from the fire, and when, by the subsidence of the insoluble matter, the supernatant liquor has become perfectly clear, transfer it by means of a siphon to a green-glass bottle

furnished with an air-tight stopper, and add distilled water, if necessary, to make its specific gravity 1·058, and its neutralising power in accordance with the test.

Tests.—The specific gravity is 1·058. A quantity weighing 462·9 grains, *i.e.* 1 fluid ounce, requires for neutralisation 482 grain-measures of the volumetric solution of oxalic acid. The solution therefore contains 5·84 per cent. by weight of hydrate of potassium, KHO. No effervescence takes place when the solution is added to an excess of diluted hydrochloric acid. Mixed with an equal volume of distilled water, solution of potash gives no precipitate with solution of lime or oxalate of ammonium. When it is treated with an excess of diluted nitric acid, and evaporated to dryness, the residue forms with water a nearly clear solution, which may be slightly precipitated with chloride of barium or nitrate of silver, but is unaffected, or but slightly affected, by ammonia. Acidulated by hydrochloric acid, the solution is unaffected with sulphuretted hydrogen. One fluid ounce contains 27 grains of hydrate of potassium.

Uses.—Solution of potash is used in the preparation of solid caustic potash. It has been recommended strongly for use in cases of tetanus. Vide Mr. J. B. Gresswell's article on this subject in 'The Veterinarian' of October, 1882.

LIQUOR POTASSII PERMANGANATIS.

Solution of Permanganate of Potassium.

Mode of Preparation.—Dissolve 1 part of permanganate of potassium in 99 fluid parts of distilled water.

Therapeutics.—Solution of permanganate of potassium is used as a gargle in aphthous and ulcerated conditions of the mouth and tongue and fauces. For foul-smelling wounds it proves useful on account of its deodorant properties. As an injection diluted with equal parts of water it is used in

gonorrhœa in bulls, and also in leucorrhœa and foul discharges from the uterus in mares and colts and other animals. Permanganate of potassium is a powerful antiseptic. It has even been used with success when subcutaneously injected near a snake-bite to frustrate the action of snake-poison, and it has been proved to destroy the deadly power of cobra poison when mixed with it outside the body. Vide 'The Veterinary Journal' for June, 1886, p. 395. In the article for 'Eczema' read 'Ozæna,' and for 'Dr. Bruton' read 'Dr. Brunton.'

LIQUOR SODÆ CHLORINATÆ.

Solution of Chlorinated Soda.

Mode of Preparation.—Dissolve 24 ounces of carbonate of sodium in 2 pints of distilled water; thoroughly triturate 16 ounces of chlorinated lime with 6 pints of distilled water, and filter. Mix well the two solutions, and filter. Keep the solution in a stoppered bottle in a cool and dark place.

Characters and Tests.—Solution of chlorinated soda is a colourless alkaline liquid, with an astringent taste and a feeble odour of chlorine. It decolorises sulphate of indigo, and is decomposed by hydrochloric acid, evolving chlorine and little or no carbonic acid gas. The specific gravity is 1·054. The solution contains about 2½ per cent. of available chlorine. It yields only a slight precipitate with oxalate of ammonium.

Preparation.—Cataplasma Sodæ Chlorinatæ.

Therapeutics.—Solution of chlorinated soda has an antiseptic, antacid, and stimulating action when taken internally. It is antidotic to poisoning by sulphuretted hydrogen and hydrocyanic acid. Its antiseptic properties are very marked, and it is a good deodorizer and disinfectant.

The solution is administered internally in septic diseases in horses, and when diluted it is used as a dressing for foul wounds, sores, and ulcers, and as a gargle in aphthous and ulcerated conditions of the mouth, tongue, and throat.

Posology :—

Horses and cattle	... 1 to 4 fluid drachms.
Sheep and pigs	... ½ to 1 fluid drachm.
Dogs ...	... 10 to 20 minims.

LIQUOR SODII HYDRATIS.

Solution of Hydrate of Sodium.

Synonyms —Liquor Sodæ ; Solution of Soda.

Mode of Preparation.—Dissolve 28 ounces of carbonate of sodium in 1 gallon of distilled water. Having heated the solution to the boiling-point in a clean iron vessel, gradually mix with it 12 ounces of washed slaked lime, and continue the ebullition for ten minutes with constant stirring. Remove the vessel from the fire, and when, by the subsidence of the insoluble matter, the supernatant liquor has become perfectly clear, transfer it by means of a siphon to a green-glass bottle furnished with an air-tight stopper, and add distilled water, if necessary, to make it correspond with the tests of specific gravity and neutralising power.

It will be seen that the method of preparation is the same as that for Liquor Potassii Hydratis, except that 28 ounces of the carbonate of sodium are used instead of 1 pound of carbonate of potassium.

Tests.—The specific gravity is 1·047. One fluid ounce which weighs 485 grains requires for neutralisation 470 grain-measures of the volumetric solution of oxalic acid. Solution of hydrate of sodium, therefore, contains 4·1 per cent. by weight of hydrate of sodium, NaHO. It does not effervesce when added to an excess of diluted hydrochloric acid. Mixed with an equal volume of distilled water, it gives no precipitate with solution of lime or oxalate of ammonium. When it is treated with an excess of diluted nitric acid and evaporated to dryness, the residue forms with water a clear solution

which only gives slight precipitates with chloride of barium or nitrate of silver, and none with ammonia. Acidified by hydrochloric acid, the solution is unaffected with sulphuretted hydrogen. One fluid ounce contains 18·8 grains of hydrate of sodium.

Uses.—Used in the preparation of solid hydrate of sodium.

LIQUOR STRYCHNINÆ HYDROCHLORATIS.

Solution of Hydrochlorate of Strychnine.

Mode of Preparation.—Mix 14 minims of diluted hydrochloric acid with 4 drachms of distilled water, and dissolve 9 grains of crystalline strychnine in the mixture by the aid of heat. Then add ½ fluid ounce of rectified spirit and 1 fluid ounce of water.

Character.—The strength is about 1 in 100.

Therapeutics.—See Strychnina.

Posology:—

Horses	... 2 to 4 fluid drachms.
Cattle	... 2 to 6 fluid drachms.
Sheep	... ½ to 2 fluid drachms.
Dogs	... 3 to 6 minims.

LIQUOR ZINCI CHLORIDI.

Solution of Chloride of Zinc.

Mode of Preparation.—Mix 44 fluid ounces of hydrochloric acid and 1 pint of distilled water in a porcelain dish, add 1 pound of granulated zinc, and apply heat gently until hydrogen gas is no longer evolved. Boil for half an hour, supplying the water lost by evaporation, and allow the product to cool.

Add to a few drops excess of ammonia and then sulphydrate of ammonium. If iron or lead is present a black precipitate is produced. If so, filter the remainder of the

product into a bottle, and add solution of chlorine by degrees, with frequent agitation, until the fluid acquires a permanent odour of chlorine. Add ½ ounce of carbonate of zinc in small successive quantities, and with renewed agitation, until a brown sediment appears, and the whole of the iron or lead is thus precipitated. Filter the liquid into a porcelain vessel, and evaporate it until the bulk is reduced to that of 2 pints. If no iron or lead is present, filter and evaporate to 2 pints at once.

Characters.—Solution of chloride of zinc is a colourless fluid of astringent and sweetish taste. The specific gravity is 1·46.

Therapeutics.—Solution of chloride of zinc is a powerful caustic and astringent, and is used in the treatment of protuberant granulations, and foul ulcerated surfaces. In the treatment of fistula and foot-rot the solid chloride of zinc (see Zinci Chloridum) is generally used. As a dressing for foul wounds the solution proves a useful caustic antiseptic dressing for protruding irregular pieces.

Owing to the deodorizing and disinfectant properties of chloride of zinc the solution is sometimes used for cleansing stables. With this object the solution may be exposed in open vessels or may be sprinkled over the floors.

LOBELIA.

Lobelia.

Natural Order.—Lobeliaceæ.

Description.—The dried flowering herb of Lobelia inflata, Indian tobacco, is indigenous in the United States. Lobelia is usually in compressed oblong rectangular packages, weighing from ½ pound to 1 pound each, and wrapped in sealed and labelled papers. The separate pieces are of various lengths, yellowish-green and angular. They bear sessile or stalked, hairy, oval, irregularly toothed leaves, together with some flowers and fruits. The taste is at first

mild, but after being chewed Lobelia has a burning and acrid effect on the mouth.

Preparations.—Tinctura Lobeliæ Ætherea (54½ grains to 1 fluid ounce).

Therapeutics and Posology.—Lobelia is seldom employed in veterinary practice. In small doses it is diaphoretic and expectorant, in large doses cathartic. The ethereal tincture may be given in spasmodic asthma in horses in doses of 1 fluid ounce.

LOTIO ACIDI BORICI.

Lotion of Boric Acid.

Mode of Preparation.—Dissolve 1 part of boric acid with 20 fluid parts of hot water.

LOTIO ACIDI CARBOLICI.

Lotion of Carbolic Acid.

Mode of Preparation.—Mix 1 fluid drachm of carbolic acid with 5 fluid ounces of water, and shake thoroughly.

LOTIO AMMONII CHLORIDI ET POTASSII NITRATIS.

Lotion of Chloride of Ammonium and Nitrate of Potassium.

Synonyms.—Lotio Refrigerans; Cooling Lotion.

Mode of Preparation.—Dissolve 2½ ounces of chloride of ammonium and 2½ ounces of nitrate of potassium in 1 pint of water.

Use.—Directly the salts are dissolved, dip cloths in the solution and lay them on the affected part.

LOTIO HYDRARGYRI FLAVA.

Yellow Mercurial Lotion.

Mode of Preparation.—Mix 18 grains of perchloride of mercury in 10 fluid ounces of solution of lime.

LOTIO HYDRARGYRI NIGRA.

Black Mercurial Lotion.

Mode of Preparation.—Mix 30 grains of subchloride of mercury in 10 fluid ounces of solution of lime.

MAGNESII CARBONAS.

Carbonate of Magnesium.

Formula.—$(MgCO_3)_3,Mg(HO)_2,4H_2O$.

Mode of Preparation.—Dissolve 10 ounces of sulphate of magnesium and 12 ounces of carbonate of sodium each in a pint of boiling distilled water, mix the two solutions, and evaporate the mixture to perfect dryness by means of a sand-bath. Digest the residue for half an hour with 2 pints of boiling distilled water. Collect the insoluble matter on a calico filter, wash it repeatedly with distilled water, until the washings cease to give a precipitate with chloride of barium. Finally, dry the product at a temperature not exceeding 100° C.

A light form of the same chemical compound may be prepared by dissolving the same quantities of the same two salts each in half a gallon of distilled water, mixing the two solutions when cold, and boiling the mixture in a porcelain dish for fifteen minutes. The precipitate is then transferred to a calico filter, washed with boiling distilled water, until the washings cease to give a precipitate with chloride of barium, and finally dried at a temperature not exceeding 100° C.

Characters and Tests.—Carbonate of magnesium is a white granular powder, readily soluble in diluted mineral acids with evolution of carbonic acid gas. Solutions are produced which, when first treated with chloride of ammonium, are not precipitated by the addition of an excess of solution of ammonia, but yield a copious crystalline precipi-

tate when phosphate of sodium is added. With excess of hydrochloric acid carbonate of magnesium forms a clear solution in which chloride of barium causes no precipitate. When excess of ammonia is added, no immediate precipitate is produced with oxalic acid, and none with sulphuretted hydrogen. Fifty grains subjected to a red heat are reduced to 22. The light carbonate is a very light powder.

Therapeutics.—Carbonate of magnesium neutralises normal or excessive acidity of the stomach, evolving carbonic acid gas. It is prescribed in cases of indigestion in young animals. It has also a laxative action.

Posology :—

Foals and calves	... 2 drachms to 1 ounce.
Dogs and cats	... ½ to 1 drachm.

MAGNESII OXIDUM.

Oxide of Magnesium.

Formula.—MgO.

Mode of Preparation.—Place 4 ounces of heavy carbonate of magnesium into a Cornish or Hessian crucible closed loosely by a lid, and expose it to a low red heat, so as to drive off the carbonic acid gas of which it is partly composed. Continue the heating until a small quantity, taken from the centre of the crucible, cooled, moistened with water, and dropped into warm diluted sulphuric acid, causes no effervescence. The oxide produced in this way is known as 'heavy magnesia.' The same oxide is produced in a lighter modification by heating the light carbonate of magnesium. Three and a half volumes of the light form weigh as much as one of the heavy modification.

Characters and Tests.— Oxide of magnesium is a white powder, insoluble in water, but readily dissolved by acids without effervescence. A solution in hydrochloric acid, when neutralised by a mixture of solution of ammonia

and chloride of ammonium, gives a copious crystalline precipitate when phosphate of sodium is added. Dissolved in nitric acid, and neutralised with a mixture of ammonia and chloride of ammonium, it does not give any precipitate with oxalate of ammonium or chloride of barium.

Therapeutics.—Oxide of magnesium or magnesia has antacid and laxative properties. It is prescribed with bitters in cases of indigestion, flatulence, and acidity in young animals.

It is antidotic to poisoning by oxalic acid and the mineral acids.

Posology:—

Foals and calves	... 2 drachms to 1 ounce.
Dogs and cats	... ½ to 1 drachm.

MAGNESII SULPHAS.

Sulphate of Magnesium.

Synonym—Epsom Salts.

Formula.—$MgSO_4,7H_2O$.

Characters and Tests.—Sulphate of magnesium exists in minute colourless and transparent acicular crystalline rhombic prisms, which possess a bitter taste. The salt is readily soluble in water. The aqueous solution gives, like those of all sulphates, a copious white precipitate with chloride of barium. It also affords a copious white precipitate with a mixture of ammonia, chloride of ammonium, and phosphate of sodium (owing to the magnesium). At ordinary temperatures, the aqueous solution is not precipitated by oxalate of ammonium, nor should it give a brown precipitate with chlorinated lime or soda. The crystals of sulphate of magnesium are exactly like those of sulphate of zinc, from which, however, they are readily distinguished by their bitter taste. Sulphate of zinc has a strong metallic taste.

Preparation.—Magnesii Carbonas.

Therapeutics.—Sulphate of magnesium is a hydragogue

cathartic, having also diuretic properties. It is a very useful purgative for cattle and sheep, and is also prescribed as a febrifuge for horses. It is antidotic to poisoning by lead. It is best administered in solution in water; and to prevent griping, a small quantity of ginger may be added.

Posology:—

Cathartic.

Cattle ...	... 1 to 1½ pounds.
Calves ...	... 3 to 4 ounces.
Sheep and pigs ...	... 1 to 3 ounces.
Dogs	... 1 to 4 drachms.

Febrifuge.

Horses ...	... 2 to 3 ounces, once or twice daily.

MANGANESII OXIDUM NIGRUM.

Black Oxide of Manganese.

Formula.—MnO_2.

Characters and Tests.—Black oxide of manganese is a heavy black powder, almost entirely soluble in hydrochloric acid with evolution of the yellow gas chlorine. When heated, this oxide parts with oxygen thus:—

$$3MnO_2 = Mn_3O_4 + O_2.$$

It is, however, much more extensively used for preparing oxygen by mixing it with the salt, chlorate of potassium, and heating the mixture. The evolution of oxygen takes place at a much lower temperature than is required when either compound is heated separately. It is supposed to take up the oxygen from the chlorate, and then give it up again. This is cited as an instance of what is called 'catalytic action.'

It is also used in producing the salt permanganate of potassium.

Use.—Black oxide of manganese is especially used in the generation of chlorine and oxygen gases.

MASSA ALOES.

Aloes Mass.

Synonym.—Cathartic Mass.

Mode of Preparation.—Take of

Barbadoes Aloes, 6 pounds;
Rectified Spirit, 9 fluid ounces;
Soft Soap, 9 ounces;
Oil of Peppermint, 2 ounces.

Melt together the first three ingredients over a water-bath, and add, when they are all melted, the oil of peppermint. Mix. In summer time 8 fluid ounces of rectified spirit and 8 ounces of soft soap will be the correct quantities.

Dose.—One to 8 drachms, according to the age, size, and constitution of the horse.

MASSA AMMONII CARBONATIS.

Mass of Carbonate of Ammonium.

Synonym.—Stimulating Mass.

Mode of Preparation.—Take of

Carbonate of Ammonium,
Ginger in powder,
Gentian in powder,
} of each 16 ounces.
Treacle, a sufficiency.

Powder well the carbonate of ammonium, and mix it by the help of a sieve thoroughly with the ginger and gentian. Then add a sufficient quantity of treacle by degrees, and pound well so as to form a coherent mass. This mass should be freshly made, and then made into 1 ounce balls.

Dose.—One ounce in the form of a ball may be given to a horse daily.

MASSA BELLADONNÆ COMPOSITA.

Compound Belladonna Mass.

Synonym.—Cough Mass (*a*).

Mode of Preparation.—Take of

Extract of Belladonna, ½ to 1 part;
Barbadoes Aloes, in powder, 1 part;
Nitrate of Potassium, in powder, 2 parts;
Common Mass, a sufficient quantity.

Mix so as to form a coherent mass.

Use.—Useful in cases of chronic cough in horses.

Dose.—Four to 5 drachms.

MASSA CAMPHORÆ COMPOSITA.

Compound Camphor Mass.

Synonym.—Cough Mass (*b*).

Mode of Preparation.—Take of

Camphor, 2 parts;
Asafœtida, 2 parts;
Ammoniacum, 2 parts;
Squills in powder, 1 part;
Soft Soap, a sufficient quantity.

Use.—Useful in cases of moist cough in horses.

Dose.—One ounce in the form of a ball daily.

MASSA COMMUNIS.

Common Mass.

Mode of Preparation.—Take of

Linseed, finely powdered, }
Treacle, } equal parts.

Mix well together so as to form a mass.

Use.—Common mass is used as an excipient for various medicinal agents, when they are to be administered in the form of a ball.

MASSA DIGITALIS COMPOSITA.

Compound Digitalis Mass.

Synonym.—Cough Mass (*c*).

Mode of Preparation.—Take of

Barbadoes Aloes, in powder, 2 parts;
Digitalis, 1 part;
Common Mass, 13 parts.

Mix thoroughly.

Use.—In cases of chronic cough in horses.

Dose.—One ounce in the form of a ball, once or twice a day.

MASSA FERRI CARBONATIS COMPOSITA.

Compound Mass of Carbonate of Iron.

Synonym.—Alterative Mass.

Mode of Preparation.—Take of

Resin, 35 parts;
Nitrate of Potassium, 21 parts;
Sulphur, 7 parts;
Gentian, 14 parts;
Carbonate of Iron, 7 parts;
Oil of Cubebs, $\frac{1}{4}$ part;
Turpentine, } of each a sufficiency.
Soft Soap, }

Dose.—One ounce for a blood horse, or for a cart horse 9 drachms. As an alterative once or twice weekly; as a diuretic once daily. For grease once every other day.

MASSA FERRI SULPHATIS.

Sulphate of Iron Mass.

Synonym.—Tonic Mass.

Mode of Preparation.—Take of

Sulphate of Iron, in powder, 2 parts;
Ginger, in powder, 1 part;
Gentian, 1 part;
Common Mass, 5 parts;

Thoroughly mix.

Use.—Useful in giving tone to the system, especially in cases where iron is indicated.

Dose.—Six drachms to 1 ounce in the form of a ball may be given to a horse occasionally.

MISTURA RICINI.

Castor-oil Draught.

Synonym.—Cathartic mixture for dogs.

Mode of Preparation.—Take of

Castor Oil, 3 parts;
Syrup of Buckthorn, 2 parts;
Syrup of Poppies, 1 part.

Mix.

Posology:—

Dog ... ... 4 to 8 fluid drachms.

MORPHINÆ ACETAS.

Acetate of Morphine.

Formula.—$C_{17}H_{19}NO_3,HC_2H_3O_2.3H_2O$.

Mode of Preparation.—Dissolve 2 ounces of hydrochlorate of morphine in 1 pint of distilled water, and add solution of ammonia until the morphine is precipitated and the liquid rendered slightly alkaline. Collect the precipitate on a filter, wash it with distilled water, and then, having transferred it to a porcelain dish, add 4 ounces of distilled water and a sufficient quantity of acetic acid to neutralise and dissolve it. Evaporate the solution by means of the heat of a water-bath, maintaining acetic acid in slight excess until it concretes on cooling. Lastly, dry the salt with slight heat, so as to avoid much loss of acetic acid, and reduce it to powder. Keep the product in a well-stoppered bottle. Acetate of morphine may also be prepared by the action of acetic acid on pure morphine.

Characters and Tests.—Acetate of morphine is a white powder, almost entirely soluble in $2\frac{1}{2}$ parts of water at the

ordinary temperature, and readily soluble in spirit. From a solution of acetate of morphine hydrate of potassium throws down a precipitate which is dissolved by excess of the alkali. Ignited with free access of air, it leaves no residue. Like hydrochlorate of morphine, when moistened with strong nitric acid, it becomes orange-red, and like this salt also, with solution of perchloride of iron, it becomes greenish-blue. When sulphuric acid is added to the salt, acetous vapours are evolved.

Preparations:—

Injectio Morphinæ Hypodermica (1 grain in 10 minims).

Liquor Morphinæ Acetatis (1 grain in 100 fluid grains).

Therapeutics.—See Morphinæ Hydrochloras and Opium.

Posology:—

By the mouth.

Horses and cattle ...	... 3 to 5 grains.
Sheep and pigs ...	... $\frac{1}{2}$ to 2 grains.
Dogs	... $\frac{1}{8}$ to $\frac{1}{2}$ grain.

Hypodermically.

Horse and cattle ...	... 3 grains.
Sheep and pigs ...	... $\frac{1}{2}$ grain.
Dogs	... $\frac{1}{10}$ grain.

MORPHINÆ HYDROCHLORAS.

Hydrochlorate of Morphine.

Formula.—$C_{17}H_{19}NO_3,HCl,3H_2O$.

Mode of Preparation.—The process is a long, complicated, and delicate one, but may be shortly described as follows: Concentrated infusion of opium must be mixed with chloride of calcium, and decolorized by animal charcoal. Then by the addition of ammonia the morphine is to be precipitated. The morphine is then placed in a small quantity of boiling

distilled water contained in a porcelain capsule kept hot, and then diluted hydrochloric acid must be added with caution and constant stirring, so that the morphine may be entirely dissolved and a neutral solution obtained. Set aside to cool and crystallize. Drain the crystals, and dry them on filtering paper. By further evaporating the mother liquor, and again cooling, additional crystals are obtained.

Characters and Tests.—Hydrochlorate of morphine exists in the form of a white powder, or in that of thin prisms possessing a silky lustre. The salt is not changed by exposure to the air. It is soluble in twenty-four parts of water at the ordinary temperature, and readily in spirit.

An aqueous solution yields a white curdy precipitate with solution of nitrate of silver, and a white one with solution of hydrate of potassium soluble in excess of the alkali. Like the acetate of morphine, when moistened with nitric acid, hydrochlorate of morphine becomes orange-red, and, with solution of perchloride of iron, greenish-blue. If hydrochlorate of morphine is warmed with strong sulphuric acid and a little arseniate of sodium, a bluish-green tinge results. If ignited with free access of air, it burns without leaving any residue.

Preparation.—Liquor Morphinæ Hydrochloratis (1 grain in 100 fluid grains).

Action.—The action of the salts of morphine differs but little from that of opium (see Opium). Opium, however, is more slowly absorbed, and inasmuch as it contains alkaloids which have a convulsive action its sedative effect is not so marked as in the case of morphine. Opium also has a greater effect on the skin than this alkaloid.

Uses.—In veterinary practice the salts of morphine are especially employed in those cases where it is desired to produce a rapid effect, and, being very suitable for hypodermic injection, they are generally administered by this

method. The effect of the alkaloid moreover is of a more definite character, and in consequence it is for this reason also sometimes preferred to the crude opium.

In cases of enteritis, spasmodic colic, acute dyspepsia, post-partum hæmorrhage and straining, and spasmodic cough, the hypodermic injection of morphine is of great value. In the treatment of tetanus also in horses, the hypodermic injection of this alkaloid is sometimes efficacious in relieving the severity of the spasmodic seizures. In cases of diarrhœa and obstruction of the bowels, the crude opium is to be preferred, because it reaches the bowel directly. In diabetes and in peritonitis also, opium is preferable. As an external application to the eye, opium itself is less irritating than morphine.

Posology:—

By the mouth.

Horses and cattle ...	... 3 to 10 grains.
Sheep and pigs ...	... $\frac{1}{2}$ to 2 grains.
Dogs	... $\frac{1}{8}$ to $\frac{1}{2}$ grain.

Hypodermically.

Horses	... 3 grains.
Sheep and pigs ...	... $\frac{1}{2}$ grain.
Dogs	... $\frac{1}{10}$ grain.

MORPHINÆ SULPHAS.

Sulphate of Morphine.

Formula.—$(C_{17}H_{19}NO_3)_2,H_2SO_4,5H_2O$.

Mode of Preparation.—Sulphate of morphine is prepared by adding to the morphine (produced as for the hydrochlorate of morphine) about twice its weight of boiling distilled water, and then, while keeping the mixture hot, pouring on it gradually and with constant stirring, diluted sulphuric acid, so that the morphine may be entirely dis-

solved and a neutral solution obtained. Then set aside in order that cooling and crystallization may go on. Drain the crystals, and dry them on filtering paper. Evaporate the liquor, and cool again in order that additional crystals may be produced.

Characters and Tests.—Sulphate of morphine exists in the form of colourless, silky, acicular crystals, soluble in twenty-four parts of water at ordinary temperatures, and sparingly in rectified spirit. Solution of hydrate of potassium yields, when added to an aqueous solution of sulphate of morphine, a precipitate which is soluble in excess of the alkali. Solution of chloride of barium gives, as with all solutions of sulphates, a white precipitate of sulphate of barium, which is insoluble in hot hydrochloric acid. Like the acetate and the hydrochlorate of morphine, sulphate of morphine, moistened with strong nitric acid, becomes orange-red, and with solution of perchloride of iron, greenish-blue.

Therapeutics and Posology.—The uses and doses are the same as those of the acetate and hydrochlorate of morphine.

MUCILAGO ACACIÆ GUMMIS.

Mucilage of Gum Acacia.

Mode of Preparation.—Place 2 parts by weight of gum acacia and 3 fluid parts of distilled water into a covered earthen jar, and stir frequently until the gum is dissolved If necessary strain the solution through muslin.

Therapeutics.—Mucilage of gum acacia is demulcent and emollient, and is administered when the alimentary tract is irritated by the ingestion of poison, or by inflammatory action.

Posology:—

The dose is ad libitum.

MUCILAGO AMYLI.

Mucilage of Starch.

Mode of Preparation.—Triturate 24 parts by weight of starch with 875 fluid parts of distilled water, adding the latter gradually. Then boil for a few minutes, constantly stirring.

Preparations:—

Enema Aloes.
Enema Opii.
Enema Terebinthinæ.

Use.—Mucilage of starch is used in the preparation of enemata.

MYRRHA.

Myrrh.

Natural Order.—Amyridaceæ.

Description.—Myrrh is a gum-resinous exudation obtained from the stem of Balsamodendron Myrrha. It occurs in the form of irregular tears, or in that of masses of agglutinated tears, which vary much in size. The colour is reddish-yellow or reddish-brown externally. Myrrh is dry, and generally more or less covered with a fine powder. The surface resulting from a fracture is irregular. Myrrh is a brittle substance, somewhat translucent, oily, and frequently marked with opaque whitish spaces or striæ. The odour is agreeably aromatic, and the taste is aromatic and bitter.

Preparation.—Tinctura Myrrhæ.

Therapeutics.—Externally myrrh acts as a stimulant, astringent and deodorizer, and is applied in the form of tincture to wounds and ulcers. Internally, in virtue of its stomachic and slightly tonic properties, it is sometimes given in cases of dyspepsia, and as an adjuvant to other

purgatives, especially aloes. As a stimulating and disinfecting expectorant it is sometimes prescribed in chronic bronchitis in horses.

Posology :—

Horses and cattle	... 2 to 4 drachms.
Sheep and pigs ...	... ½ to 1 drachm.
Dogs	... 10 to 30 grains.

NUX VOMICA.

Nux Vomica.

Natural Order.—Loganiaceæ.

Description.—The seeds of Strychnos Nux Vomica are round, from about $\frac{7}{8}$ inch to 1 inch in diameter, and on an average nearly ¼ inch thick. They are flattish or concavo-convex, or sometimes bent irregularly. One surface is marked by a central scar or hilum, from which a line which projects more or less markedly passes to the margin, where it terminates in a slight prominence. Externally, nux vomica seeds are ash-grey or of a yellowish-grey-green colour, and being covered with short hairs they present a glistening appearance like that of satin. Internally, they are horny, and somewhat translucent. They possess no odour, are very poisonous indeed, and the taste is extremely bitter.

Preparations :—

Extractum Nucis Vomicæ (which contains 15 per cent. of alkaloids).

Strychnina.

Tinctura Nucis Vomicæ (which contains 1 grain of alkaloids in 1 fluid ounce).

Action.—Nux vomica and its alkaloid strychnine have the properties of bitters. They have stomachic properties, and act as augmenters of the intestinal peristalsis. Exter-

nally strychnine has a slightly irritant and powerfully antiseptic action, though on account of its intensely poisonous character it cannot be applied to wounded surfaces. After absorption into the blood strychnine rapidly enters the tissues and organs of the body, especially those of the nervous system. It remains in the body some time before being eliminated, and as it is absorbed very quickly after ingestion, it is 'cumulative.'

In medicinal doses nux vomica and its alkaloid are valuable tonics. Large doses cause rigidity and spasm of all the voluntary muscles.

Poisonous doses cause violent convulsions and death by exhaustion and asphyxia from spasmodic arrest of the respiratory muscles. These effects are due to the powerful irritation of the motor centres of the cord, the reflex excitability of which is immensely augmented. The convolutions of the brain are not acted upon. All the chief centres of the medulla oblongata are aroused by strychnine. The respiratory centre, vaso-motor, and cardiac centres are excited to increased activity. The temperature is raised during the spasmodic contractions.

Uses.—Nux vomica and its alkaloid strychnine are given with the object of stimulating the motor tract of the cord in paralysis proceeding from disease of this structure. In paralysis succeeding febrile diseases, and in that form which is due to lead poisoning, nux vomica is especially useful. In such cases as these nux vomica or strychnine may be given by the mouth, or the alkaloid may be injected locally into the paralyzed muscles. In beasts, nux vomica has been successfully given in chronic paralysis and in puerperal apoplexy in cows; and after parturition in these animals when there is partial paralysis of the hind-quarters, nux vomica has been successfully given.

Nux vomica and strychnine are of no value in sensory

paralysis, but in amaurosis in horses strychnine has been injected hypodermically near the temple with advantage. Nux vomica given by the mouth has also proved of benefit in some instances in this affection.

In stringhalt in horses, and in chorea in horses and dogs, nux vomica is often useful. In cases of torpid bowels nux vomica acts well by increasing the peristaltic action. It is best prescribed with other aperients, especially aloes, and its administration in small doses may be continued for several days. In cases of chronic bronchitis it often proves *very* beneficial indeed in horses and cattle, and it may be advantageously combined with expectorants.

Strychnine is antagonistic to poisoning by chloral, morphine, and physostigmine.

Posology :—

Horses	...	... 20 grains to 1 drachm.
Cattle	...	... 20 grains to 1 drachm.
Sheep	...	... 5 to 20 grains.
Pigs...	...	... 5 to 15 grains.
Dogs	...	... ½ to 2 grains.

OLEATUM HYDRARGYRI.

Oleate of Mercury.

Mode of Preparation.—Stir continually in a mortar 9 parts of oleic acid, while adding gradually 1 part of yellow oxide of mercury, and triturate occasionally until it is all dissolved. If only 4½ parts of oleic acid are used, the remaining 4½ should be added before use.

Characters.—This preparation, known as oleate of mercury, is a light-brown, oleaginous, semi-solid substance, which is really composed of oleate of mercury and oleic acid, and has a slight smell of oleic acid. When it is gently warmed, no black precipitate separates. If a piece of copper

foil is heated with oleate of mercury, the copper acquires a thin coating of metallic mercury, which is shown when the foil is rubbed with a cloth.

Therapeutics.—Oleate of mercury is used as an application to bursal enlargements in horses.

OLEATUM ZINCI.

Oleate of Zinc.

Mode of Preparation.—Stir 1 part of oxide of zinc with 9 parts of oleic acid, allow the mixture to stand for 2 hours, and heat on a water-bath until the oxide is dissolved.

Preparation.—Unguentum Zinci Oleati.

Therapeutics.—A mixture of equal parts of vaseline and oleate of zinc is used as an application in the treatment of eczema, having a very beneficial action.

OLEUM AMYGDALÆ.

Almond Oil.

Characters.—The oil expressed from the bitter or the sweet almond is thin, pale, yellow, nearly inodorous, and possesses a bland, oleaginous, and nutty taste.

Preparations :—

Oleum Phosphoratum.
Unguentum Simplex.

Therapeutics.—Almond oil is used in the preparation of phosphorated oil. It has demulcent and nutritive properties, and is often substituted for olive and other oils.

OLEUM ANISI.

Oil of Anise.

Characters.—The oil distilled in Europe from anise-fruit, or in China from star-anise fruit, is colourless or of a very

pale yellow appearance. It has the characteristic odour of the fruit, and a sweet aromatic taste. The ordinary oil of anise-fruit congeals at from 10° to 15·5° C., and may remain solid at as high a temperature as 17·2° C.; while the oil of star-anise fruit only becomes solid at a few degrees above 0° C.

Preparation.—Tinctura Camphoræ Composita.

Therapeutics.—Oil of anise has a similar action to that of the other aromatic oils, being a cordial stimulant, and diminishing reflex excitability. It has a stimulant action on the bronchial mucous membrane, and is thus often added to cough mixtures. It is antiseptic also. It is chiefly used for flavouring mixtures and masses; and, as a preventive against griping, in virtue of its carminative properties, it is often added to purgative masses. For destroying pediculi it is sometimes mixed with oil and applied to the skins of small house-dogs.

OLEUM CAJUPUTI.

Oil of Cajuput.

Natural Order.—Myrtaceæ.

Characters.—Oil of cajuput, which is distilled from the leaves of the plant Melaleuca minor, is a transparent, limpid, very volatile, pale, bluish-green liquid. It possesses a strong, penetrating, and agreeable odour like that of camphor, and a warm, bitterish, aromatic, camphoraceous taste, which is succeeded by a sensation of coldness in the mouth.

Preparation.—Linimentum Crotonis.

Therapeutics.—Oil of cajuput is now seldom used in veterinary practice. It has a similar action to that of oil of cloves. Externally it is sometimes employed in virtue of its counter-irritant properties in cases of chronic rheumatism. Internally it acts as a diffusible stimulant, antispasmodic, and

diaphoretic, and has been given with benefit in colic in horses.

OLEUM CARYOPHYLLI.

Oil of Cloves.

Natural Order.—The Eugenia caryophyllata, of which plant cloves are the dried flower-buds, is a member of the natural order Myrtaceæ.

Characters.—The oil distilled in Britain from cloves is colourless, of a pale yellow colour when recent, but gradually becomes reddish-brown. It has in a high degree the odour and taste of cloves. It is heavier than, and therefore sinks in, water.

Use.—In preparing sections for the microscope, oil of cloves is of great value, since it clears up and renders transparent the various tissues.

Therapeutics.—Oil of cloves is an aromatic volatile oil seldom used in veterinary practice. Internally it is stomachic, carminative, antispasmodic, and stimulant. As a corrective to prevent the griping caused by purgatives it is sometimes given along with them, and is also added to mixtures used in cases of diarrhœa accompanied by pain.

OLEUM CROTONIS.

Croton Oil.

Natural Order.—Euphorbiaceæ.

Characters.—This poisonous oil, which is expressed in Britain from the seeds of Croton Tiglium, is of a brownish-yellow or dark reddish-brown colour, fluorescent, and of a viscid consistence. The viscidity is increased by age. The odour is faint, peculiar, somewhat rancid, and disagreeable. The taste is oily and acrid. Croton oil is entirely soluble in alcohol.

Preparation.—Linimentum Crotonis (1 volume in 8).

Therapeutics.—Croton oil is a rapidly acting drastic cathartic. Its irritant effect is chiefly due to the direct inflammation it causes in the mucous membrane. It produces also watery exudation, augmented peristalsis, and increased glandular activity. For horses its action is too violent for any but very exceptional cases. For cattle it is indicated in cases of obstinate constipation, and in cases of inflammation of the brain where it is necessary to act copiously on the bowels.

Croton oil is a powerful irritant to the skin, but its action is too violent for horses and dogs, though for cattle it is sometimes used in cases of chronic glandular enlargements and rheumatic enlargements of the joints. When the skin is thin, the oil may be absorbed, causing its cathartic action.

Posology :—

Horses ...	... 15 to 20 minims.
Cattle ...	... 20 minims to 1 drachm.
Sheep and pigs	... 2 to 6 minims.
Dogs ...	... $\frac{1}{2}$ to 3 minims.

OLEUM EUCALYPTI.

Oil of Eucalyptus.

Natural Order.—Myrtaceæ.

Characters.—The oil, distilled from the fresh leaves of Eucalyptus Globulus, Eucalyptus amygdalina, and probably other species of Eucalyptus, is colourless or of a pale straw-colour. It becomes both darker and thicker by exposure. Oil of eucalyptus possesses an aromatic odour, a spicy and pungent flavour, and leaves a sensation of coldness in the mouth. In reaction it is neutral. The specific gravity is about 0·9. The oil is soluble in about an equal weight of alcohol.

Preparation.—Unguentum Eucalypti.

Therapeutics.—Oil of eucalyptus is a powerful antiseptic, more than three times as strong as carbolic acid in preventing the development of bacteria, and it is not so poisonous. Unlike carbolic acid, it is not caustic when applied to the skin, and it does not cause much irritation of a mucous membrane. It is an excellent antiseptic for veterinary purposes, and is used in the form of ointment or in solution. Vaseline is an excellent basis for oil of eucalyptus, and lard also is a good medium. Solutions of the oil have a powerful effect in checking fetor of decomposing discharges, and both the ointment and the solution have great healing power.

Internally, the action of the oil is nearly the same as that of turpentine. It is antipyretic and antiperiodic, but has not yet been much given in veterinary practice.

OLEUM JUNIPERI.

Oil of Juniper.

Natural Order.—Coniferæ.

Characters.—The oil, distilled in Britain from the full-grown but unripe green fruit of Juniperus communis, is colourless or of a pale, greenish-yellow colour, and possesses the characteristic odour of the fruit and a warm aromatic taste.

Preparation.—Spiritus Juniperi (1 volume in 50).

Therapeutics.—Oil of juniper has stomachic, stimulant, antispasmodic, and diuretic properties. It is administered as a diuretic in dropsy dependent upon cardiac or hepatic mischief.

Posology:—

Horse ...	... 1 drachm.
Cattle ...	... 2 drachms.
Sheep and pigs	... 10 to 15 minims.
Dog ...	... 3 to 6 minims.

OLEUM LAVANDULÆ.

Oil of Lavender.

Natural Order.—Labiatæ.

Characters.—The oil, distilled in Britain from the flowers of Lavandula vera, is pale yellow or nearly colourless, and possesses the very fragrant characteristic odour of the flowers, and a hot, bitter, aromatic taste.

Preparation.—Linimentum Camphoræ Compositum (60 minims in 1 pint).

Therapeutics.—Oil of lavender is an aromatic volatile oil, having a similar action to that of the other members of the same class of oils.

OLEUM LINI.

Linseed Oil.

Natural Order.—Linaceæ.

Characters.—The oil, expressed in Britain without heat from linseed, is viscid, yellow, with a faint odour and bland oleaginous taste. Linseed oil gradually thickens by exposure to the air.

Therapeutics.—Linseed oil is emollient and laxative in action. It is administered as a mild cathartic in cases of debilitating diseases in horses, cattle, and dogs. In cases of irritability of the intestines, when it is desired to unload the bowels, linseed is a useful aperient. In pregnant animals, in irritant poisoning, in cases where other purgatives have been given without effect, the oil is a bland and safe agent for administration. In choking, it gives relief in virtue of its emollient properties. In colic, it is commonly given with sulphuric ether and tincture of opium. It proves a suitable medium for the administration of oil of turpentine and croton oil, and it is injected into the rectum to soften the impacted fæces and allay irritability.

Externally, in virtue of its emollient properties, it proves useful as an application for irritable cracked surfaces, and it forms a useful basis for applying astringent and other applications in eczema and other diseases of the skin.

Posology:—

Horses ...	... ½ to 1 pint.
Cattle ...	... 1 to 2 pints.
Sheep and pigs	... 3 to 6 fluid ounces.
Dogs ...	... 1 to 2 fluid ounces.
Cats ...	... 1 drachm.

OLEUM MENTHÆ PIPERITÆ.

Oil of Peppermint.

Natural Order.—Labiatæ.

Characters.—The oil, distilled in Britain from fresh flowering peppermint, Mentha piperita, may be colourless, pale yellow, or greenish-yellow when recent, but becomes gradually thicker and of a red hue by age. Peppermint oil has the odour of peppermint, and a strong penetrating aromatic taste, which is followed by a sensation of coldness in the mouth.

Therapeutics.—Oil of peppermint has a similar action to that of the other aromatic oils, and is often added as a corrective and carminative to purgative medicines.

OLEUM MORRHUÆ.

Cod-liver Oil.

Class.—Gadus Morrhua, the cod, from the liver of which the oil is extracted, is a member of the Class Pisces.

Characters.—The oil, extracted from the fresh liver of the cod by the application of a heat not exceeding 82·2° C.,

is of a pale yellow colour, and possesses a slight fishy odour and a bland fishy taste.

Test.—If a drop of sulphuric acid be added to a few drops of the oil placed on a porcelain slab, a violet colour is produced, which soon passes to a yellowish or brownish-red.

Therapeutics.—Cod-liver oil has nutritive and alterative properties, and increasing the richness of the chyle, it improves the quality of the blood, and is thus hæmatinic and tonic. It is more easily absorbed than other oils, and has some special virtue owing to the traces of iodine, bromine, phosphates, and other salts which it contains.

Cod-liver oil is sometimes given to horses after debilitating diseases and in broken wind. In cattle also it is sometimes given, more especially after affections of the lungs and in tuberculosis.

For dogs and cats it is far more commonly administered than in cattle and equine practice. In distemper, debility, rickets, and in many chronic diseases it is of great benefit to these animals. The best time to administer the oil is during or shortly after a meal. It is generally given in gruel. A good mixture for the small animals may be made by adding 10 minims of pure ether to each drachm of the oil, and this will be more readily retained by them.

Posology:—

Horses ...	... 2 to 3 fluid ounces.
Cattle ...	... 3 to 6 fluid ounces.
Sheep ...	... 1 fluid ounce.
Pigs ...	... ½ to 1 fluid ounce.
Dogs ...	... 1 to 4 fluid drachms.
Cats ...	... 1 fluid drachm.

OLEUM OLIVÆ.

Olive Oil.

Natural Order.—Oleaceæ.

Characters.—The oil, expressed from the ripe fruit of Olea Europæa, is of a pale yellow or greenish-yellow colour, and possesses a very faint agreeable odour and a bland oleaginous taste. At a temperature of about 2·2° C. the oil partially congeals.

Preparations :—

Emplastrum Picis.
Linimentum Ammoniæ.
Linimentum Calcis.
Linimentum Camphoræ.
Unguentum Cantharidum.
Unguentum Hydrargyri.
Unguentum Hydrargyri Nitratis.
Unguentum Veratrinæ.

Therapeutics.—Olive oil has nutritive, emollient, and laxative properties. It enters the blood from the lacteals or lymphatics, and is to be regarded as a food. In cases of poisoning by corrosives it has an emollient action on the intestinal tract, and it retards the solution and absorption of preparations of arsenic. Corrosive alkalies act upon it, forming soap.

For external purposes it is rarely used in veterinary practice, cheaper oils being generally substituted.

OLEUM PHOSPHORATUM.

Phosphorated Oil.

Mode of Preparation.—Heat a sufficient quantity of oil of almonds in a porcelain dish to a temperature of 149° C., and keep up this heat for fifteen minutes. Then let it cool,

and filter it through paper. Place 4 fluid ounces of this oil into a stoppered bottle capable of holding 4½ fluid ounces, and add to it 16 grains of pure dry phosphorus. Immerse the bottle in hot water until the oil has become heated to 82·2° C., removing the stopper two or three times in order to allow the escape of expanded air. Then shake the oil and phosphorus together until the latter is entirely dissolved.

Characters.—Phosphorated oil is clear, straw-coloured, and phosphorescent in the dark. It contains about 1 per cent. of phosphorus.

Therapeutics.—Phosphorus is a powerful nerve tonic, aphrodisiac, and stimulant, and has also alterative properties. It has been very little used as yet in veterinary practice. Phosphorated oil is recommended by Mr. J. B. Gresswell in conjunction with strychnine in motor paralysis in horses, and it may be administered in doses of 20 minims.

Posology :—

Horses... ... ... 10 to 20 minims.

OLEUM RICINI.

Castor Oil.

Natural Order.—Euphorbiaceæ.

Characters.—The oil, expressed from the seeds of Ricinus communis, is viscid and colourless, or of a pale straw-yellow colour. It has scarcely any odour, and the taste, which is at first mild, becomes subsequently acrid and unpleasant. Castor oil is entirely soluble in one volume of absolute alcohol, and in two volumes of rectified spirit.

Therapeutics.—Castor oil is a mild purgative, acting rapidly and certainly, without causing griping. It is generally suitable for administration to young animals and

to those debilitated, or in the pregnant condition. It is not so suitable for horses as for cattle, sheep, and dogs. For the dog it is usually prescribed with spirit or with mucilage, in order to obviate the nauseating effect which it sometimes is otherwise apt to cause. Castor oil is the laxative employed in irritable conditions of the alimentary canal, such as diarrhœa, dysentery, and enteritis. It is also commonly given when a bland purgative is required in cases of inflammation of the kidneys and in those instances where other purgatives have already been given without effect, or where it is required to administer them for a lengthened period. For the pig it is a very suitable purgative.

Posology :—

Horses ...	... 1 pint.
Cattle ...	... 1 to 2 pints.
Calves ...	... 4 to 6 fluid ounces.
Sheep and pigs	... 2 to 3 fluid ounces.
Dogs ...	... 1 to 2 fluid ounces.
Cats ...	... $\frac{1}{2}$ to 1 fluid ounce.

OLEUM SANTALI.

Sandal-Wood Oil.

Natural Order.—Santalaceæ.

Characters.—The oil, distilled from the wood of Santalum album, is thick, of a pale-yellow colour, and possesses a strongly aromatic odour, a pungent and spicy flavour, and a neutral or slightly acid reaction. The specific gravity of the oil is usually about 0·96. Oil of sandal-wood is readily soluble in alcohol.

Therapeutics.—Oil of sandal-wood has, like copaiba, a stimulant and disinfectant effect on the genito-urinary tract. It has also diuretic and expectorant properties. It has been given by Mr. J. B. Gresswell to bulls suffering from gonorrhœa with great advantage, and it may also be

administered in cases of vaginitis in mares and cows. It is more easily taken than copaiba, and the dose may be repeated once daily.

Posology :—

Horses	...	... 4 fluid drachms.
Cattle ...	...	... 6 fluid drachms.

OLEUM SINAPIS.

Oil of Mustard.

Natural Order.—Cruciferæ.

Characters.—The oil, distilled with water from black mustard seeds after the expression of the fixed oil, is colourless or of a pale-yellow appearance. The specific gravity is about 1·017. The oil boils at about 147·8° C., and dissolves readily in alcohol and ether, and to a small extent in water. Oil of mustard has an intensely penetrating and very characteristic odour, and a very acrid burning taste. If applied to the skin it produces almost instant vesication.

Preparation.—Linimentum Sinapis Compositum.

Therapeutics.—Oil of mustard is used in the preparation of the compound liniment of mustard.

OLEUM TEREBINTHINÆ.

Oil of Turpentine.

Natural Order.—Coniferæ.

Characters.—The oil is distilled, usually by the aid of steam, from the oleo-resin, turpentine, which is obtained from Pinus Australis, Pinus Tæda, and sometimes from Pinus Pinaster, and Pinus Sylvestris, and is rectified if necessary. Oil of turpentine is limpid, colourless, possesses a strong peculiar odour, which varies in the different kinds, and has a pungent and bitterish taste. It boils at about 160° C., and almost entirely distils below 180° C., leaving little or no residue.

Preparations :—

Enema Terebinthinæ.
Linimentum Terebinthinæ.
Linimentum Terebinthinæ Aceticum.
Unguentum Terebinthinæ.

Therapeutics.—*Externally.*—When applied to the skin or exposed mucous surfaces, oil of turpentine acts as a local stimulant and counter-irritant, having also antiseptic and disinfectant properties. It is largely employed in making various counter-irritant liniments. As an external application it is for most purposes more suitable for cattle than for horses, in which if much used it is liable to cause blemishing. For cases of chronic rheumatic affections of the muscles or joints, for bruises and sprains after the acute inflammatory stage is passed, and for painful neuralgic affections, oil of turpentine is a suitable agent for use. In cases of inflammation of the respiratory organs and in colic of the spasmodic or flatulent variety, it is commonly used as a counter-irritant. For all such purposes the ammonia and turpentine liniment serve well; but belladonna, opium, aconite, or other sedative agents may be added when necessary, as in painful muscular rheumatism or neuralgic affections. For destroying pediculi on the skin, for applying to foul sores, ulcers, or other such purposes, one part of oil of turpentine to three or four of linseed or olive oil, or of vaseline or of lard, gives a suitable strength.

Internally.—Oil of turpentine is a powerful carminative, acting as a stimulant to the muscular coat of the large intestine, causing contraction and expulsion of gas and fæces in cases of atony or tympanitic distension of this part of the bowel, and it also acts as a disinfectant and vascular stimulant. In larger doses purgation is produced. It is destructive to worms, and is consequently a valuable anthelmintic. It has a sedative action on the cerebral and spinal centres, and

this is manifested after the reflex stimulant effect caused by its action on the vessels and nerves of the stomach. The heart's action is lessened, and the blood-pressure falls. From this latter effect, oil of turpentine proves to be a very valuable hæmostatic in cases of bleeding from internal organs. On the bronchial walls it acts as a vascular stimulant. It is excreted by the skin, kidneys, and respiratory passages. Being liable to cause irritation and congestion of the urinary organs, it is not much employed in disease of these and other internal organs. In small doses it causes diuresis, and it is hence sometimes given in hæmaturia with advantage when administered with care, and likewise in small doses in inflammation of the kidneys.

Oil of turpentine is given in a great variety of diseases in veterinary practice as an antispasmodic and carminative. In cases of spasmodic and flatulent colic, and in indigestion in horses, in tympanitis and dysentery in cattle, it is administered with great benefit. In colic, dysentery, and protracted diarrhœa it is usually combined with opium, catechu, or other agents. In chorea in dogs it is sometimes given as an antispasmodic with advantage. As a stimulant it proves valuable in cases of pulmonary congestion, restoring the flagging circulation. After the early stages of some of the specific fevers, as influenza, strangles, and scarlet fever in horses, it acts as a stimulant and antiseptic. In cases of purpura hæmorrhagica in horses it is customary to prescribe oil of turpentine with tincture of perchloride of iron, the mixture having a very good effect. As an expectorant it is often given in cases of chronic bronchitis, and in the later stages of inflammation of the lungs it is a useful remedy. As a hæmostatic and astringent it is given in cases of passive hæmorrhages from the internal organs. In melæna in horses and cattle it may be combined with opium and tannic acid or galls. In hæmaturia in cattle it may be given with

tannic and diluted sulphuric acids. As a diuretic turpentine is given in cases of cardiac dropsy, and in suppression of the urine, dependent upon weakened action of the central organ of circulation. It is much given in cases of puerperal fever in cows, and is mostly combined with solution of or carbonate of ammonia, or with an alcoholic stimulant.

As an anthelmintic, oil of turpentine is largely used in horses, cattle, sheep, pigs, and dogs.

Before oil of turpentine is administered as an anthelmintic it is customary to open the bowels by a cathartic, and then to allow a long fast. Male fern is often given with the turpentine for tapeworm in the horse. The following formula from Mr. J. B. Gresswell's 'Veterinary Pharmacology' is a good one, but the liquid extract of male fern is rather too expensive for general use :

℞ Extracti filicis liquidi, ʒss.
Olei absinthi, ʒss.
Olei terebinthinæ, ʒss.
Olei lini, ʒiv. ss.

This mixture may be followed by the administration of 3 ounces of chloride of sodium and 1 ounce of ginger. For tapeworm in dogs areca nut and male fern are prescribed with oil of turpentine.

To round worms turpentine proves very destructive when given by the mouth, but if the worms are lodged in the lower part of the bowel it may be administered by enemata. In hoose, in cases of worms in the air-passages of calves and lambs, oil of turpentine given by the mouth proves very useful. Intra-tracheal injection of 1 drachm of oil of turpentine, 20 minims of carbolic acid, and 30 minims of chloroform is said to be efficacious in destroying Strongyli Micruri in the air-passages of calves.

Posology :—

As a stimulant, antispasmodic, and anthelmintic.

Horses	... 1 to 2 fluid ounces.
Cattle	... 1 to 3 fluid ounces.
Sheep and pigs	1 to 4 fluid drachms.
Dogs	... 30 to 60 minims.

As a diuretic.

Horses	... 4 to 6 fluid drachms.
Cattle	... 6 fluid drachms to 1 fluid ounce.

OPIUM.

Opium.

Natural Order.—Papaveraceæ.

Mode of Preparation.—Opium is the juice obtained by incision from the unripe capsules of the poppy, Papaver somniferum (grown in Asia Minor), and inspissated by spontaneous evaporation. The unripe capsules are incised, or rather deeply scratched. A milky juice exudes, becomes inspissated by spontaneous evaporation, and is scraped off and made into lumps. As these ought to consist only of the tears of thickened juice from the incisions, the lumps should tear with an irregular surface, and, when drawn across a piece of paper, should leave a light-brown interrupted streak. If vegetable extracts are also present, the lumps have a more even fracture, and make a more even streak on a piece of paper. Any ordinary variety of opium may be employed for the preparation of alkaloids. For other purposes opium obtained in Asia Minor should be used. The strength also should be such that, after the opium has been dried and powdered, the powder after being heated to 100° C., so long as it loses moisture, should yield

not less than 9·5 per cent., and not more than 16 per cent. of morphine.*

Characters.—Opium occurs in round, irregular, or flattened masses or lumps, which generally vary in weight from about 4 ounces to 2 pounds. The substance is usually enveloped in portions of poppy leaves, and here and there the surface is covered with the reddish-brown chaffy fruits of a species of Rumex. When fresh, opium is plastic, and can be torn without difficulty. An internal surface as thus exposed is somewhat moist, coarsely granular, reddish or chestnut-brown, and shines when rubbed smooth with the finger. By being kept, opium becomes harder, and darkens to a blackish-brown colour. The odour is characteristic, strong, and narcotic. Opium is very poisonous, and possesses a bitter and nauseous taste.

Preparations :—

Enema Opii (which contains $\frac{1}{2}$ fluid drachm of the Tincture to 2 fluid ounces).

Extractum Opii (about 1 part from 2).

Linimentum Opii (1 volume of the Tincture in 2 volumes).

Morphinæ Acetas (about 1 part from 8 or 10).

Morphinæ Acetatis Liquor ($4\frac{1}{2}$ grains of Acetate in 1 fluid ounce).

Morphinæ Hydrochloras (about 1 part from 8 or 10).

Morphinæ Hydrochloratis Liquor ($4\frac{1}{2}$ grains of the Hydrochlorate in 1 fluid ounce).

Morphinæ Sulphas (about 1 part from $7\frac{1}{2}$).

Pulvis Ipecacuanhæ Compositus (1 part in 10).

Tinctura Camphoræ Composita (2 grains to 1 fluid ounce).

Tinctura Opii (nearly 33 grains to 1 fluid ounce).

Unguentum Gallarum cum Opio (32 grains to 1 ounce).

* Commercial samples contain generally about 15 per cent. of morphine.

Therapeutics :—

Action.—On the bowels opium has an anodyne and astringent action. When given in large and frequent doses it paralyzes the intestines.

The principal action of opium is on the nervous system, but it must be pointed out that animals show wide dissimilarity in their degree of susceptibility to its influence in this and other ways. Thoroughbred and other excitable horses are more readily influenced than cart-horses of sluggish temperament. Ruminants are not very susceptible to its action, whereas dogs are as readily influenced by it as men. The cerebral convolutions are at first excited, but the period of exaltation is succeeded by depression, during which drowsiness followed by sleep supervenes. When an excessive dose has been taken the stage of excitement is absent, and there is great depression of the cerebrum, during which the animal becomes comatose and insensible to external stimuli. Opium then has a stimulant, anodyne, hypnotic, and narcotic action on the brain; and these effects, it may be remarked, are more developed in man than in animals. The pupils are contracted under the influence of opium, owing to its effect on the basal ganglia of the brain. The motor centres of the brain and cord are first stimulated and then depressed, but muscular irritability is not completely lost, even when large doses have been taken. The centres in the medulla oblongata are markedly affected by opium. The respiratory centre is depressed, death by opium being due to paralysis of this centre. The cardiac centre is first excited and then depressed. The vaso-motor centre is also depressed.

On the respiratory functions opium is powerfully depressant. The bronchial secretions are diminished or inspissated by its action on the glands of the mucous membrane, and the activity of the pulmonary circulation is diminished.

Uses.—Opium is one of the most valuable and commonly prescribed of the medicinal agents of the Pharmacopœia.

It is largely employed to relieve pain and spasm. In peritonitis it is of great efficacy in quieting the peristaltic action of the bowels and relieving the acute agony, and in many diseases of the bowels themselves it is constantly given to ease the acute pain. In enteritis, gastritis, irritability of the stomach, and in acute inflammation of the pleura, it gives great relief. As an antispasmodic and anodyne it proves useful in cases of colic, whether of the spasmodic or flatulent type; and in cases of diarrhœa and dysentery it allays irritation, diminishes secretion, and calms the movements of the intestines. As an antispasmodic and anodyne, the effects of opium are enhanced by its combination with belladonna, Indian hemp, conium, or chloral hydrate. Having a soothing effect on the vessels and circulation, it is given in various passive hæmorrhages, as a hæmostatic in cases of melæna, and in cases of muco-enteritis the hypodermic injection of morphine and atropine is strongly recommended to diminish the rapid exudation of blood and serum into the walls of the intestines. Opium is not given when there is evidence of deficient action of the kidneys. On account of its soothing action on the bronchi, lungs, and on the respiratory centre, opium is given in cough and dyspnœa; but it should be administered with care, as these symptoms are frequently beneficial manifestations. When the cough is due to remote irritation or to excessive irritability of the nerves and centre, it can be administered, as also when it is due to conditions such as a growth in the bronchi, or the lungs, or to pressure on these parts. Opium is generally prescribed with expectorants, such as ammonia and ipecacuanha, which prevent dangerous depression of the local nerves and centre. In idiopathic tetanus in young animals the hypodermic injection of morphine is often very beneficial,

and this treatment may be combined with the administration of bromide of potassium or monobromide of camphor.* In acute cases of tetanus in adults, the local injection of morphine into the muscles in which the spasmodic attacks are especially marked is often effectual in giving temporary relief. In acute inflammatory diseases opium is not suitable for administration. In 'diabetes insipidus' in horses it is often beneficial, but is not so much given as it used to be in this disease—iodine, iodides, arsenic and other remedial agents being more employed. To prevent abortion, and relieve post-partum pains, opium is employed in preference to any other agent.

Locally, opium is employed to relieve pain. For painful wounds and bruises, for inflammatory and painful affections of the skin, it is a useful anodyne. For conjunctivitis also it is a good local application. For wounds and bruises, 10 drops of the tincture to each ounce of water is a suitable strength, and for conjunctivitis 5 drops, to which 5 drops of solution of acetate of lead may be added, will be a suitable strength. For piles the ointment of opium and galls, or equal parts of this and of ointment of hamamelis, will prove useful. The enema opii is indicated in cases of inflammation of the kidneys, bladder, uterus, and rectum.

Posology :—

Horses	...	... 1 to 2 drachms.
Cattle	...	... 2 to 4 drachms.
Sheep	...	... 10 to 40 grains.
Pigs	...	... 5 to 15 grains.
Dogs	...	... ½ to 4 grains.
Cats	...	... ½ to 2 grains.

* Monobromide of Camphor is recommended by Messrs. Gresswell in the 'Equine Hospital Prescriber.'

OXIDUM ARSENIOSUM.

Arsenious Oxide.

Formula.—As_2O_3.

Mode of Preparation.—Arsenious oxide is an anhydride, obtained by roasting arsenical ores. It is purified by sublimation.

Characters and Tests. — Arsenious oxide occurs as a heavy white powder, or in sublimed masses, which usually present a stratified appearance, which is caused by the fact that they consist of separate layers differing from one another in degree of opacity. If slowly sublimed in a glass tube, this oxide forms minute, brilliant, and transparent crystals of octahedral character. It is sparingly soluble in cold water, more so in boiling water. The aqueous solution is odourless and tasteless, and gives with ammonio-nitrate of silver a canary-yellow precipitate which is insoluble in water but readily dissolved by ammonia and by nitric acid. If the oxide is sprinkled on a red-hot coal it gives rise to an alliaceous odour. At a temperature not exceeding 204·4° C., it is entirely volatilised.

Preparations:—

Liquor Arsenicalis (1 grain in 100 fluid grains).
Liquor Arsenii Hydrochloricus (1 grain in 100 fluid grains).
Ferri Arsenias.
Sodii Arsenias.

Therapeutics.—Externally, arsenious oxide is irritant, caustic, and antiseptic. It is used in the form of a paste (made of 1 part of the oxide, 1 part of charcoal, 5 parts of red sulphuret of mercury and water), to destroy warts and sometimes also for limited malignant growths. Arsenic being absorbed from the unbroken skin requires to be used with caution.

Internally, arsenic stimulates the nerves and vessels of the mucous membrane of the stomach, and in larger doses irritates them, causing pain and gastro-intestinal inflammation. Solution of arsenious oxide is the best preparation of arsenic for internal purposes. With iron, arsenic often has a good effect in anæmia, and is one of the best hæmatinics and tonics. In irritative dyspepsia it is best given as Fowler's solution, with alkalies and bitters, and is especially useful in this disease in dogs. Increasing the vital activity of the organs of the body, arsenic acts as a general tonic and as an alterative. It is, like quinine, antiperiodic, and is hence useful in malaria. It has also a decided effect on the nervous system, being found in the grey matter of the cord in cases of poisoning by arsenic. It diminishes the sensibility and reflex irritability of the centres of the cord, and afterwards affects the motor nerves and muscles. In chorea it is often of benefit after other drugs have failed. Affecting the metabolism of the liver, it also often proves useful in cases of diabetes in horses. In many forms of skin diseases in the various animals, owing to its action on the integument, it is greatly employed. In psoriasis, chronic eczema, and acne, it is especially valuable. In farcy it also has often a very good effect. It must be remembered that when arsenic is taken in too large doses or for too long a time, it causes debility, disturbance of nutrition, and nervous derangement. Its action must therefore be watched.

Posology:—

Horses and cattle	... 2 to 4 grains.
Sheep and pigs	... $\frac{1}{4}$ to 1 grain.
Dogs ...	... $\frac{1}{30}$ to $\frac{1}{15}$ grain.

OXIDUM CHROMICUM.

Chromic Oxide.

Formula.—CrO_3.

Mode of Preparation.—Chromic oxide is an anhydride, and is obtained as follows: Mix together gradually and with care 50 fluid ounces of distilled water and 42 fluid ounces of sulphuric acid. Dissolve in this mixture 30 ounces of bichromate of potassium, and set aside for twelve hours, and then decant the liquor from the crystals of acid sulphate of potassium which have separated. Heat the liquor to about 85° C., and add 15 fluid ounces of sulphuric acid, and water in sufficient quantity to just redissolve any crystals of chromic acid that may have been formed. Allow the liquor to cool. Collect and drain the crystals, and dry them on porous tiles at a temperature not exceeding 37·8° C. in an air-bath. By evaporating the remaining liquor more crystals can be obtained.

Characters and Tests.—Chromic oxide occurs in the form of crimson acicular crystals, which are very deliquescent, inodorous, and corrosively caustic. At a high temperature it melts, and at a still higher decomposes, giving off oxygen gas, and leaving a greenish-black residue. If chromic oxide is warmed with hydrochloric acid, chlorine is evolved, and a green residue remains.

Chromic oxide is soluble in water, forming a deep orange-red solution. If it is placed in contact with alcohol, glycerine, and some other organic matters, sudden combustion or explosion may ensue. A solution of 1 or 2 grains in 2 or 3 ounces of water should afford only a faint opalescence with chloride of barium.

Preparation.—Liquor Acidi Chromici (1 part in 4).

Therapeutics.—See Liquor Acidi Chromici.

OXYMEL.

Oxymel.

Mode of Preparation.—Liquefy by heat 8 parts by weight of clarified honey, and mix with it 1 fluid part of acetic acid and 1 fluid part of distilled water.

OXYMEL SCILLÆ.

Oxymel of Squill.

Mode of Preparation.—Mix 5 fluid parts of vinegar of squill with 8 parts by weight of clarified honey. Evaporate by a water-bath until the product, when cold, shall have a specific gravity of 1·32.

Therapeutics and Posology.—The uses and doses of oxymel of squills are the same as those of acetum scillæ.

PARAFFINUM DURUM.

Hard Paraffin.

Synonyms.—Paraffin; Paraffin Wax; Solid Paraffin.

Mode of Preparation.—Hard paraffin, a mixture of several of the harder members of the paraffin series of hydrocarbons, is usually obtained by distillation from shale, separation of the liquid oils by refrigeration, and purification of the solid product.

Characters and Tests.—Hard paraffin is colourless, semi-transparent, crystalline, inodorous, tasteless, slightly greasy to the touch, insoluble in water, slightly soluble in absolute alcohol, freely soluble in ether. At about 53° C. it melts and burns with a bright flame, leaving no residue. The average specific gravity is 0·88.

Preparations :—

Unguentum Acidi Borici.
Unguentum Acidi Carbolici.
Unguentum Acidi Salicylici.
Unguentum Eucalypti.
Unguentum Potassæ Sulphuratæ.
Unguentum Sulphuris Iodidi.
Unguentum Veratrinæ.

Therapeutics.—See succeeding substance.

PARAFFINUM MOLLE.

Soft Paraffin.

Synonyms.—Petrolatum; Pétroléine; Unguentum Paraffinum.

Mode of Preparation.—This semi-solid mixture, which is known in commerce by various names, contains some of the more fluid members of the paraffin series of hydrocarbons, and is usually procured by purifying the less volatile portions of petroleum.

Characters.—Soft paraffin is white or yellowish, translucent, soft, greasy, and free from acidity, alkalinity, or any unpleasant odour or flavour, even when warmed to 48·9° C. The specific gravity at the melting point is about 0·855. The melting point is about 38° C., or even somewhat higher. It volatilizes without giving acrid vapours, and burns with a bright flame, leaving no residue. Soft paraffin is insoluble in water, slightly soluble in absolute alcohol, freely in ether, chloroform, benzol, etc. It is not saponified by solutions of alkalies.

Preparations :—

Unguentum Acidi Borici.
Unguentum Acidi Carbolici.
Unguentum Acidi Salicylici.

Preparations (*continued*) :—

Unguentum Eucalypti.
Unguentum Potassæ Sulphuratæ.
Unguentum Sulphuris Iodidi.
Unguentum Veratrinæ.
Unguentum Zinci Oleati.

Therapeutics.—Hard and soft paraffin are sometimes used instead of lard as a basis for ointments. Not being absorbed by the skin, paraffin is only used in making those ointments which are not intended to enter the system and produce a specific effect.

PEPSIN.

Pepsin.

Mode of Preparation.—The fresh and healthy stomach of the pig, sheep, or calf recently killed, should be cut open and laid on a board with the inner surface upwards. Food, dirt, or other impurity must be removed. The exposed surface should then be slightly and rapidly washed with a little cold water. The cleansed mucous membrane is then to be scraped with a blunt knife, or by other suitable means, with some pressure. The viscid pulp obtained must then be immediately spread over the surface of glass or glazed earthenware, and quickly dried at a temperature not exceeding 37·8° C. The dried residue is then to be reduced to powder and placed in a stoppered bottle.

Characters and Tests.—Pepsin is a light yellowish-brown powder, with a faint but not disagreeable odour, and a slightly saline taste. There should not be the least indication of putrescence. It is very little soluble in water or in spirit.

Therapeutics.—Pepsin is a valuable remedy in cases of indigestion in dogs, and it is best administered to them, either with or immediately before or after meals, on meat, or in solution with 5 to 10 minims of diluted hydrochloric

acid and 10 minims of spirit of chloroform, or in the form of a pill.

For calves and foals it has likewise been given with diluted hydrochloric acid, in cases of indigestion and diarrhœa, with great advantage.

Posology :—

Foals and calves...	... 30 to 40 grains.
Dogs	... 5 to 10 grains.

PHOSPHORUS.

Phosphorus.

Characters and Tests. — Phosphorus, a non-metallic element obtained from bones, is a semi-transparent, colourless, wax-like solid, which emits white vapours when exposed to the air. The specific gravity is 1·77. At common temperatures the element is soft and flexible. At 43·3° C. it melts, and at a temperature slightly higher it ignites in the air, burning with a luminous flame and producing dense white fumes. It is insoluble in water, but soluble in ether and in boiling oil of turpentine.

Preparations :—

Acidum Phosphoricum Concentratum.
Acidum Phosphoricum Dilutum.
Oleum Phosphoratum.

Therapeutics.—Phosphorus has been as yet very little employed in veterinary practice. It is used in the preparation of phosphoric acid and phosphorated oil. The latter has been found useful, when given with strychnine, in cases of motor paralysis (see Oleum Phosphoratum).

Externally phosphorus is irritant and caustic. Internally it increases metabolism and has alterative and aphrodisiac properties. When given continuously, it leads to fatty degeneration of the protoplasm of the body.

PHYSOSTIGMATIS SEMEN.

Calabar Bean.

Natural Order.—Leguminosæ.

Characters.—The dried seed of Physostigma venenosum varies from about 1 inch to $1\frac{1}{4}$ inch long. The seed is $\frac{3}{4}$ inch broad, $\frac{1}{2}$ inch or somewhat more in thickness, oblong and more or less reniform in shape, and provided with a long, broad, blackish furrow running entirely along its convex side. The taste is hard, brittle, roughish, deep chocolate-brown or brownish-red in colour, and encloses a closely-adhering nucleus, which principally consists of two hard white brittle cotyledons, separated from each other by a somewhat large cavity. The seed is inodorous, is exceedingly poisonous, and has no marked taste beyond that of an ordinary bean. It yields its properties to alcohol, and imperfectly to water. The cotyledons, when moistened with solution of hydrate of potassium, acquire a permanent pale yellow colour.

Preparation.—Extractum Physostigmatis.

Therapeutics and Posology.—See Physostigmine.

PHYSOSTIGMINA.

Physostigmine.

Synonym.—Eserine.

Formula.—$C_{15}H_{21}N_3O_2$.

Mode of Preparation.—The alkaloid physostigmine or eserine is obtained from the alcoholic extract of Calabar bean. This is dissolved in water, and to the solution bicarbonate of sodium is added. The mixture is shaken with ether, and the ethereal liquid is evaporated.

Characters and Tests.—Eserine consists of colourless or pinkish crystals. It is slightly soluble in water, but readily

in alcohol and in diluted acids. An aqueous solution has an alkaline reaction. When it is warmed or shaken with diluted solution of hydrate of potassium it becomes red, and when evaporated to dryness over a water-bath, leaves a bluish residue, the acidified solution of which is beautifully dichroic, being blue and red. Physostigmine causes contraction of the pupil of the eye.

Preparation.—Lamellæ Physostigminæ.

Action. — Calabar bean stimulates voluntary and involuntary muscle fibre throughout the body, and paralyzes the nerve centres. Physostigmine or eserine paralyzes the nerve centres and stimulates muscular fibre, but Calabarine produces convulsions like strychnine. A small dose of physostigmine acts on the involuntary muscle of the walls of the stomach and gut, causing increased peristalsis and abdominal pain. This physiological property of the alkaloid has lately been turned to account in the employment of this agent administered hypodermically in cases of impaction of the bowels in horses and cattle. It causes diarrhœa and increased peristaltic action, which culminates in tetanic contraction, so that the lumen of the intestine is almost obliterated. Under the influence of large doses of the alkaloid an animal manifests slight tremulousness, which increases until the whole frame becomes limp and flaccid, the pupils contract, salivation is produced, and slowness of the pulse and spasmodic breathing are caused. The excitability of the muscles is increased, but their capacity for doing more work is not enhanced. General paralysis follows, the posterior columns of the cord being first acted upon and then the anterior columns. If the dose taken be very large, the bowels and bladder are emptied involuntarily, all reflex excitability of the cord is destroyed, respiration becomes slower and slower and at length ceases, and death results from paralysis of the respiration. Immediately after

death the pupils dilate, but the muscles appear to be unaffected; they contract when cut, and respond to irritation of their nerves.

In an animal under the influence of physostigmine, the respiratory movements cease before the reflex action of the cord is destroyed. The motor nerves are not usually affected until very late. The sensory nerves are partially paralyzed by the local application of physostigmine in a concentrated form, but not when it is injected into the blood. When applied locally to the eye, physostigmine causes contraction of the pupils and diminishes intra-ocular tension.

Uses.—In tetanus of the traumatic and idiopathic varieties in horses, Calabar bean given by the mouth, and physostigmine given hypodermically, have been largely tried. Authorities are, however, not agreed as to the beneficial action of the bean and its alkaloid in this disease. There is no doubt that, if administered at frequent intervals, the spasmodic seizures are held in check by the paralyzing influence of the drug, but unfortunately it does not seem to have any permanent beneficial effect. The employment of physostigmine, preferably given by hypodermic injection, is of greater efficacy than that of the bean, which contains also Calabarine.

Of late, sulphate of physostigmine injected hypodermically has been recommended by Dieckerhoff in cases of impaction of the bowels in horses and cattle. We have tried it in several instances, but have never had any decided good results by this method. When, however, small quantities of a solution of eserine were injected into the jugular vein, the results were always in the highest degree satisfactory. This latter method of treatment in horses and cows in the cases tried by us caused copious voiding of fæces in 10 to 15 minutes after injection. Physostigmine causes contrac-

tion of the pupil, and is applied locally in solution in glaucoma. For these purposes a few drops of a solution of 1 to 2 grains of physostigmine to the ounce of water may be placed in the corner of the eye.

Posology :—

Powdered Calabar beans.

Horses and cattle ...	... 5 to 7 grains.
Dogs	... $\frac{1}{2}$ to 1 grain.

Physostigmine by the mouth.

Horses and cattle ...	... $\frac{1}{8}$ grain.
Dogs	... $\frac{1}{40}$ to $\frac{1}{20}$ grain.

Physostigmine hypodermically.

Horses and cattle ...	... $\frac{1}{16}$ grain.

Sulphate of physostigmine, hypodermically in colic and impaction of the bowels.

Horses and cattle ...	... $\frac{1}{2}$ to $1\frac{1}{2}$ grains.

Sulphate of physostigmine, intravenously in obstinate impaction of the bowels (J. B. Gresswell).

Horses and cattle ...	... $\frac{1}{2}$ to 1 grain.

PILOCARPINÆ NITRAS.

Nitrate of Pilocarpine.

Formula.—$C_{11}H_{16}N_2O_2,HNO_3$.

Mode of Preparation.—Pilocarpine is an alkaloid obtained from extract of jaborandi by shaking it with chloroform and alkali, and evaporating the solution thus obtained. The nitrate of pilocarpine is made by neutralising pilocarpine with nitric acid, and purifying by re-crystallization.

Characters.—Nitrate of pilocarpine is a white crystalline powder or consists of acicular crystals. It is slightly

soluble in cold water, more so in 8 or 9 parts of water at the ordinary temperature, and freely soluble in hot rectified spirit. It causes contraction of the pupil of the eye.

Tests.—If strong sulphuric acid is added, a yellowish solution is formed, which with bichromate of potassium gradually acquires an emerald-green colour. Nitrate of pilocarpine leaves no ash when burned with free access of air.

Therapeutics.—The alkaloid of jaborandi has as yet been very little used in veterinary practice (see Jaborandi). In equine practice the hypodermic injection of nitrate of pilocarpine has been recommended in azoturia in horses.*

Posology :—

	Hypodermically.
Horses ...	... 2 to 3 grains.

PIMENTA.

Pimento.

Natural Order.—Myrtaceæ.

Characters.—The dried, unripe, full-grown fruit of Pimenta officinalis is a dry, light, roundish body, one-fifth of an inch or more in diameter. It is crowned with the remains of the calyx, which is generally seen as a raised scar-like ring. The pericarp is roughish, owing to the presence of oil-glands. It is brittle, dark-brown, and divided by a very thin lighter-coloured partition into two cells, each of which contains a black or brown, reniform, circular, somewhat compressed reniform seed. The odour is aromatic. The taste both of the pericarp and of the seed is warm, aromatic, and peculiar, but like that of cloves. Of the two the pericarp imparts the stronger taste.

* See 'Azoturia' in 'The Manual of the Theory and Practice of Equine Medicine' (Gresswell).

Preparations :—

Aqua Pimentæ (14 ounces to 1 gallon).
Tinctura Pimentæ.

Therapeutics.—The uses of pimento are the same as those of the other aromatics. Pimento is often given in spasmodic and flatulent colic with other remedies as a carminative.

Posology :—

Horses ...	... 2 to 4 drachms.
Cattle ...	... ½ to 1 ounce.
Sheep and pigs	... ½ to 1 drachm.
Dogs ...	... 10 to 20 grains.

PIPER NIGRUM.

Black Pepper.

Natural Order.—Piperaceæ.

Characters.—The dried unripe fruit of Piper Nigrum is roundish, and usually about one-fifth of an inch in diameter. The pericarp is thin, blackish-brown, wrinkled, and contains a hard, smooth, roundish seed of a yellowish-brown or grey colour. The odour is aromatic. The taste is excessively pungent and bitterish. When black pepper is eaten, the mucous membrane of the mouth is greatly irritated, and an almost instantaneous flow of saliva ensues.

Therapeutics.—Black pepper is given in cases of indigestion in virtue of its action as a local stimulant and aromatic on the mouth, stomach, and intestine. When applied locally it has rubefacient, anodyne, and counter-irritant properties ; but is now rarely or never used for external purposes.

Posology :—

Horses ...	... 1 drachm.
Cattle ...	... 2 drachms.
Sheep and pigs	... 10 to 30 grains.
Dogs ...	... 5 to 10 grains.

PIX BURGUNDICA.

Burgundy Pitch.

Natural Order.—Coniferæ.

Characters.—Burgundy pitch is the resinous exudation obtained from the stem of Pinus Picea, melted and strained. It is hard, brittle, but gradually takes the form of the vessel in which it is kept. It is somewhat opaque, and dull reddish-brown, or yellowish-brown. The fracture is clear and conchoidal. Burgundy pitch has an agreeable and aromatic odour, especially when heated, and a sweet aromatic and not bitter taste. It is readily soluble in glacial acetic acid.

Preparation.—Emplastrum Picis (2 parts in 11).

Therapeutics.—Burgundy pitch has a slightly stimulant action on the skin, and is used for making stimulant and adhesive plasters.

PIX LIQUIDA.

Tar.

Natural Order.—Coniferæ.

Characters.—Tar is a bituminous liquid, obtained from the wood of Pinus sylvestris, and other species of Pinus, by destructive distillation. It is a dark-brown or blackish semi-liquid substance, possessing a peculiar aromatic odour. Water agitated with it acquires a pale-brown colour, sharp empyreumatic taste, and acid reaction.

Preparation.—Unguentum Picis Liquidæ.

Therapeutics. — When taken internally, tar acts as a

disinfectant and deodorant, and is still sometimes prescribed as such in cases of chronic bronchitis.

Externally, it acts as a vascular stimulant, antiseptic, and tissue alterative in cases of certain dry skin diseases, more especially in chronic eczema, and pityriasis. In virtue of its disinfectant and deodorant properties it is useful in cases of thrush in the frog and in foot-rot in sheep, and is a common ingredient in the so-called hoof ointments prepared for promoting the growth of healthy horn in horses' feet. As an antiparasitic, it enters into the composition of some ointments for mange and phtheiriasis.

PLUMBI ACETAS.

Acetate of Lead.

Formula.—$Pb(C_2H_3O_2)_2,3H_2O$.

Mode of Preparation.—Mix 2 pints of acetic acid and 1 pint of distilled water, add 24 ounces of oxide of lead in fine powder, and dissolve with the aid of a little heat. Filter, evaporate until a pellicle forms, and add a little acetic acid if the fluid has not a distinctly acid reaction. Then set aside in order that crystals may be formed. Finally drain and dry the crystals on filtering paper without heat.

Characters and Tests.—Acetate of lead exists in white crystalline masses. It is slightly efflorescent, has an acetous odour, and a sweet astringent taste. A solution in distilled water is clear, or has only a slight milkiness, which disappears on the addition of acetic acid. An aqueous solution slightly reddens litmus, gives a yellow precipitate with iodide of potassium, and a white precipitate with sulphuric acid, acetic acid being set free.

Preparation.—Liquor Plumbi Subacetatis (5 ounces to 1 pint.

Therapeutics.—Externally, acetate of lead is astringent,

antiphlogistic, and sedative. Solution of subacetate of lead is the preparation usually employed for external purposes (see Liquor Plumbi Subacetatis). For ulcers, powdered acetate or carbonate of lead may be sprinkled over the diseased tissue. As an injection, 3 to 5 grains of acetate of lead to each ounce of water, is very useful in cases of gonorrhœa or in discharges from the vagina. For relieving the pain in burns and scalds, 1 part of the solution of subacetate of lead to 5 of linseed oil is a suitable strength for application.

Internally, acetate of lead is the most suitable salt of the metal for administration. It has powerful hæmostatic and astringent properties. On the intestine it acts by diminishing the secretions, contracting the vessels, and diminishing the peristaltic action. On this account it is a valuable remedy for cases of protracted diarrhœa and dysentery, and is best combined with opium. As a hæmostatic it is not much employed in veterinary practice, though its action in this respect is very marked indeed. It has, however, been prescribed in melæna or hæmorrhage from the bowels, and also in hæmaturia.

Having a cumulative action, its administration must be discontinued if any bad effects, as dyspeptic symptoms, loss of appetite, colic or constipation, supervene. The liver, kidneys, central nervous system, and the bones, are the chief seats of the deposition of lead in the body.

Posology :—

Horses	...	... 40 grains to 1 drachm.
Cattle	...	... 1 drachm.
Calves	...	... 10 to 15 grains.
Sheep	...	... 5 to 10 grains.
Lambs	...	... 3 to 5 grains.
Pigs	...	... 5 to 10 grains.
Dogs	...	... 2 to 4 grains.

PLUMBI OXIDUM.

Oxide of Lead.

Synonym.—Litharge.

Formula.—PbO.

Characters and Tests.—Oxide of lead occurs in heavy scales of a pale brick-red colour. It is completely soluble without effervescence in diluted nitric and acetic acids, and each solution, when neutral, gives a copious yellow precipitate with iodide of potassium. A solution of oxide of lead in diluted nitric acid, when supersaturated with ammonia and then cleared by filtration, does not exhibit a blue colour.

Preparations :—

Liquor Plumbi Subacetatis.
Plumbi Acetas.

Therapeutics.—Oxide of lead or litharge is only employed for external purposes. It is sometimes used for dusting ulcerated surfaces in virtue of its astringent properties, but being liable to absorption, it is not so suitable as the oxide of zinc.

PODOPHYLLI RESINA.

Resin of Podophyllum.

Natural Order.—Ranunculaceæ.

Mode of Preparation.—Exhaust 1 pound of podophyllum rhizome in No. 40 powder, with 3 pints or a sufficiency of rectified spirit by percolation. Place the tincture in a still, and draw off the greater part of the spirit. Slowly pour the liquor which remains after the distillation of the tincture

into three times its volume of the water, constantly stirring. Let the mixture stand for twenty-four hours to deposit the resin. Wash the resin on a filter with distilled water, and dry it in a stove.

Characters.—Resin of podophyllum is an amorphous powder which varies in colour from pale yellow to deep orange-brown. It is soluble in rectified spirit and in ammonia, and is precipitated from its solution in the former by the addition of water, and from solution in the latter by acids. It is partly soluble in pure ether.

Therapeutics.—Podophyllin is a powerful hepatic stimulant, and in large doses a violent purgative. It is seldom prescribed in veterinary practice except for dogs, on which it acts powerfully as an hepatic stimulant. For horses and cattle it may be given with calomel or aloes. For dogs it may be combined with calomel, grey powder, or jalap.

Posology :—

Horses and cattle ...	... 1 to 2 drachms.
Dogs	... 1 to 2 grains.

PODOPHYLLI RHIZOMA.

Podophyllum Rhizome.

Natural Order.—Ranunculaceæ.

Characters.—The dried rhizome and rootlets of Podophyllum peltatum, or the American May-apple, sometimes called Mandrake in the United States, over which it is extensively diffused and whence it is imported, occur in flattened cylindrical pieces of different lengths, and from about $\frac{1}{5}$ to $\frac{1}{3}$ inch thick. At varying intervals are seen large irregular tuberosities where the rhizome is thickened. These are marked above by a depressed circular scar, and

give off below a number of very brittle brownish rootlets. The latter are very readily broken off, leaving little round white scars or spots, which make podophyllum easily distinguishable from roots similar in other points. Externally the rhizome and rootlets are dark reddish-brown or reddish-yellow, and are smooth or somewhat wrinkled. The pieces break with a short fracture, exposing an internal whitish surface. The powder is mealy, yellowish-grey, faintly narcotic and sweetish in odour, and in taste bitterish, subacrid, and nauseous. The most important constituents are podophyllin, which is a resinous substance, and berberine, which is a yellow alkaloid having little physiological action.

Therapeutics.—See preceding article.

POTASSII BICARBONAS.

Bicarbonate of Potassium.

Synonym.—Acid Carbonate of Potassium.

Formula.—$KHCO_3$.

Mode of Preparation.—Bicarbonate of potassium may be obtained by saturating a strong aqueous solution of carbonate of potassium with carbonic acid gas, and recrystallizing the salt which separates.

Characters and Tests.—Bicarbonate of potassium occurs in the form of colourless right rhombic prisms. The salt is not deliquescent, and is not corrosive. The taste is saline and feebly alkaline. Diluted hydrochloric acid, when added to it, causes strong effervescence, and forms a solution with which perchloride of platinum gives a yellow precipitate of the double chloride of platinum and potassium.

A quantity of bicarbonate of potassium which weighs

20 grains neutralises 14 grains of citric acid or 15 grains of tartaric acid.

General Action of the Salts of Potassium.—Potassium salts are more readily absorbed and more easily excreted than sodium salts. When applied to muscle in large doses they lessen its power, and may finally paralyze it. In addition to the action on muscle they depress the nervous and cardiac tissues, paralysing the nerve centres after a primary transitory excitement. In large doses a rapid fall of the blood-pressure and pulse-rate is induced, but in smaller doses a slight fall of both pulse-rate and pressure is followed by a rise of both (Brunton).

Externally hydrate of potassium is powerfully caustic and irritant, and the carbonates and the liquor are antacid.

Internally caustic potash and the bicarbonate of potassium are antidotic to poisoning by caustic acids. Liquor potassii hydratis and bicarbonate of potassium are stomachic, stimulating the flow of gastric juice. For this reason they are often given in dyspepsia. The sulphate and tartrate of potassium are saline purgatives. The bicarbonate, carbonate of potassium, and solution of hydrate of potassium increase the alkalinity of the blood, and are often prescribed in acute rheumatism (articular and muscular). Potassium salts being rapidly excreted, chiefly by the kidneys, act on the renal epithelium, and several of them on this account possess diuretic properties. The acetate, carbonate, bicarbonate, and sulphate are often prescribed as diuretics. In cases of gravel the bicarbonate is given as an alkalinizer of the urine. Lastly, several of the salts, notably the iodide, act in medicinal doses as saline expectorants. The bicarbonate is the salt selected as a stimulant of the liver. The potassium salts, in virtue of their excretion by the liver, stomach, and respiratory passages and skin, act also as stimulants of the various secretions of these organs.

Preparations containing potassium and compounds of potassium :—

Antimonii Potassio-tartras.
Argenti et Potassii Nitras.
Enema Aloes.
Linimentum Iodi.
Linimentum Terebinthinæ.
Liquor Arsenicalis.
Liquor Potassii Hydratis.
Liquor Potassii Permanganatis.
Pulvis Ipecacuanhæ Compositus.
Potassii Bicarbonas.
Potassii Bichromas.
Potassii Bromidum.
Potassii Carbonas.
Potassii Chloras.
Potassii Ferrocyanidum.
Potassii Hydras.
Potassii Iodidum.
Potassii Nitras.
Potassii Permanganas.
Potassii Sulphas.
Potassii Sulphidum et Potassii Sulphas.
Sapo Mollis.
Unguentum Antimonii Potassio-tartratis.
Unguentum Iodi.
Unguentum Potassii Sulphidi et Potassii Sulphatis.
Vinum Antimoniale.

Therapeutics of Bicarbonate of Potassium.—Bicarbonate of potassium has antacid and stomachic properties. It is mildly diuretic, and is an alkalinizer of the blood and urine. It is also a saline expectorant and biliary stimulant.

Externally solutions of bicarbonate of potassium are sometimes used to relieve itching in several skin diseases,

as eczema. Internally the salt is given in dyspepsia, rheumatism, urticaria and eczema, and in cases of acid deposits and of calculi in the kidney or bladder. In dyspeptic cases bicarbonate of potassium is best given about a quarter of an hour before meals.

Posology :—

Horses and cattle ...	... ½ to 1 ounce.
Sheep	... 1 drachm.
Pigs	... 1 drachm.
Dogs	... 10 to 30 grains.

POTASSII BICHROMAS.

Bichromate of Potassium.

Formula.—K_2CrO_4,CrO_3.

Characters and Tests.—Bichromate of potassium occurs in the form of large, red, transparent, four-sided tabular crystals. It is anhydrous, and fuses below redness. At a higher temperature it is decomposed, yielding green oxide of chromium and yellow chromate of potassium. These may be separated by dissolving the chromate of potassium in water. An aqueous solution of the salt gives a yellowish-white precipitate with chloride of barium, and a purplish-red precipitate with nitrate of silver, and both these precipitates are soluble in diluted nitric acid.

An aqueous solution also, when digested with sulphuric acid and rectified spirit, acquires an emerald-green colour.

Preparation.—Oxidum Chromicum.

Therapeutics.—Bichromate of potassium has been recommended in cases of grease in horses in doses of 5 grains, and a 1 per cent. solution has been applied locally to the affected part.

POTASSII BROMIDUM.

Bromide of Potassium.

Formula.—KBr.

Mode of Preparation.—Place 2 pints of solution of hydrate of potassium into a glass or porcelain vessel, and add 4 ounces or a sufficiency of bromine in successive portions, with constant agitation, until the mixture has acquired a permanent brown tint. Evaporate the fluid to dryness; reduce the residue to a fine powder, and mix this intimately with 2 ounces of wood charcoal in fine powder. Throw the mixture, in small quantities at a time, into a red-hot iron crucible, and when the whole has been brought to a state of fusion, remove the crucible from the fire, and pour out its contents. When the fused mass has cooled, dissolve it in the water, filter the solution through paper, and set it aside to crystallize. Drain the crystals, and dry them in a warm place. By evaporating and cooling the mother-liquor, more crystals may be obtained. Bromide of potassium should be kept in a stoppered bottle.

Characters and Tests.—The salt occurs in colourless cubical crystals, has no odour, but a pungent, saline, and slightly bitter taste. It is readily soluble in water, and less soluble in spirit. An aqueous solution yields a white precipitate with tartaric acid. When to a solution of bromide of potassium in water a little chlorine is added, either as a gas or in aqueous solution, bromine is set free, and chloride of potassium is found. If now chloroform is thoroughly shaken with the liquid mixture, the bromine is dissolved in the chloroform, which is coloured red and falls to the bottom.

A solution of the salt mixed with mucilage of starch, and a drop of an aqueous solution of bromine or chlorine, does not exhibit any blue colour, as it would if iodide of potas-

sium were also present. With saccharated solution of lime, or with solution of nitrate of barium, the aqueous solution of bromide of potassium only gives a slight opacity. Diluted sulphuric acid causes no immediate yellow colouration.

Therapeutics :—

General Action of the Bromides.—Bromide of potassium is the salt generally prescribed to obtain the therapeutic action of bromine, but bromides of sodium and ammonium are very similar in their action. The bromides pass through the organs as bromide of sodium, and act especially upon the nervous system. Under their influence there is great diminution of reflex action. This is attributable chiefly to diminished activity of the brain and cord, but also to depression of the peripheral nervous filaments. The motor nerves are soothed, and the muscular power is impaired.

The bromides, by diminishing the activity of the brain, act as hypnotics, and are extensively given in many nervous diseases to soothe the excited nerve centres.

The vital centres in the medulla are depressed by the bromides, the respiration is quieted, and the heart's action is slowed and weakened. The spinal centres and spinal nerves and the muscles are depressed, and the ovarian and uterine functions are quieted.

Uses.—Bromide of potassium or the other bromides are given in epilepsy and convulsions in horses and dogs. In inflammation of the brain in horses, in excited conditions from fright, and in tetanus, they are often of value. In hysteria bromides are very efficacious. In palpitation of the heart in race-horses the bromides have a very beneficial effect.

Posology :—

Horses	...	... 2 to 6 drachms.
Cattle	...	... 2 drachms to 1 ounce.
Dogs	...	... 5 to 15 grains.

POTASSII CARBONAS.

Carbonate of Potassium.

Formula.—K_2CO_3 (with about 16 per cent. of water of crystallization).

Mode of Preparation.—Carbonate of potassium is obtained from commercial pearl-ash, the product of the lixiviation of wood-ashes, by treating the pearl-ash with its own weight of distilled water, and evaporating the solution so formed just to dryness, with brisk agitation.

Characters and Tests.—Carbonate of potassium is a white crystalline powder, alkaline and caustic to the taste, very deliquescent, readily soluble in water, but insoluble in spirit. With diluted hydrochloric acid the salt effervesces, giving off carbonic acid gas, and forming a solution with which perchloride of platinum gives a yellow precipitate of the double chloride of potassium and platinum. When exposed to a red heat, carbonate of potassium loses about 16 per cent. of its weight. When supersaturated with nitric acid, and evaporated to dryness, the residue is almost entirely soluble in water, only a little silica (an impurity) remaining undissolved. The solution thus obtained is precipitated only faintly by chloride of barium or nitrate of silver.

A quantity of carbonate of potassium weighing 20 grains neutralises 17 grains of citric acid and 18 grains of tartaric acid.

Preparations :—

Atropina.
Enema Aloes.
Liquor Arsenicalis.
Liquor Potassii Hydratis.
Potassii Sulphidum et Potassii Sulphas.

Preparations (*continued*):—

Potassii Bicarbonas.
Potassii Chloras.
Potassii Ferrocyanidum.

Therapeutics.—Carbonate of potassium is given for the same purposes and in the same doses as the bicarbonate.

POTASSII CHLORAS.

Chlorate of Potassium.

Formula.—$KClO_3$.

Mode of Preparation.—Mix 53 ounces of slaked lime with 20 ounces of carbonate of potassium (or of chloride of potassium), and triturate them with a few fluid ounces of distilled water, for the purpose of making the mixture slightly moist. Place 80 ounces of dioxide of manganese in a large retort or flask, and pour upon it 24 pints of hydrochloric acid diluted with 6 pints of water. Heat the retort or flask gently on a sand-bath, and conduct the chlorine gas as it is disengaged, first through a bottle containing 6 ounces of water, and then into a large carboy, in which has been placed the mixture of carbonate of potassium and slaked lime. When all the chlorine has come over, remove the contents of the carboy, and boil them for 20 minutes with 7 pints of distilled water. Filter and evaporate the fluid mixture until a film forms on the surface, and then set it aside to cool. The crystals thus obtained must be purified by dissolving them in 3 times their weight of boiling distilled water, and then allowing crystallization to take place again.

Characters.—Chlorate of potassium consists of colourless rhomboidal crystalline plates. The taste is cool, saline, and characteristic. The salt is sparingly soluble in cold water.

Tests.—If triturated with sulphur or with sulphides, chlorate of potassium explodes with great violence. An aqueous solution of chlorate of potassium is not affected by nitrate of silver nor by oxalate of ammonium. If heated, chlorate of potassium fuses, giving off oxygen gas and leaving a white residue which, if the decomposition has been completed, consists mainly or entirely of chloride of potassium. This readily forms with water a neutral solution which gives a white precipitate with nitrate of silver, and a yellow precipitate with perchloride of platinum.

Preparation.—Potassii Permanganas.

Therapeutics.—Small doses generally at first depress, and afterwards raise the blood-pressure and accelerate the pulse. Its action on the blood depends upon the chlorate. It is excreted unchanged, and is chiefly used in ulcerated and aphthous conditions of the mouth, in stomatitis, foot and mouth disease, and sore throat. For these purposes it is employed locally as a gargle, and internally it is given by the mouth. After absorption into the blood it is believed to give off its oxygen, and thus is believed to be of benefit in some of the specific fevers. With this object it has been given in anthrax and anthracoid diseases in horses, cattle, and sheep; in influenza, strangles, scarlet fever and purpura in horses, and in other specific diseases. In acute and chronic bronchitis, it acts by promoting expectoration.

Externally, solutions of chlorate of potassium (10 to 20 grains to the ounce of water) are sometimes applied as antiseptics to unhealthy wounds.

Posology:—

Horses ...	... 1 to 4 drachms.
Cattle ...	... 2 to 6 drachms.
Sheep and pigs	... 20 to 40 grains.
Dogs ...	... 5 to 10 grains.

POTASSII FERROCYANIDUM.

Ferrocyanide of Potassium.

Synonym.—Yellow prussiate of potash.

Formula.—$K_4FeC_6N_6,3H_2O$.

Mode of Preparation.—Ferrocyanide of potassium is obtained by fusing in an iron pot animal substances, such as the cuttings of horns, hoofs, and skins, with carbonate of potassium and iron, lixiviating the crude product with water, and purifying the salt by crystallization.

Characters.—The salt occurs in large yellow crystals, which are not affected by exposure to the air. It is soluble in water, insoluble in alcohol.

Tests.—An aqueous solution gives with persulphate of iron or other persalts of that metal a deep-blue precipitate. With sulphate of copper it yields a brick-red precipitate, and with acetate of lead a white one. If ferrocyanide of potassium is heated with diluted sulphuric acid, the gas hydrocyanic acid is evolved.

Preparation.—Acidum Hydrocyanicum Dilutum.

POTASSII HYDRAS.

Hydrate of Potassium.

Synonyms.—Potassa Caustica; Caustic Potash.

Formula.—KHO (with some impurities).

Mode of Preparation.—Boil down rapidly in a clean silver vessel 2 pints of solution of hydrate of potassium, until a clear fluid of such consistence remains, that a drop of it, when removed on a warm glass rod, solidifies on cooling. Pour this oily fluid into suitable moulds, and when it has solidified put it while still warm into stoppered bottles.

Characters.—Hydrate of potassium occurs commercially in hard white pencils or cakes. It is a very deliquescent, powerfully alkaline and corrosive salt. An aqueous solution acidulated with nitric acid yields with perchloride of platinum a yellow precipitate. With nitrate of silver and chloride of barium only scanty white precipitates are produced.

Preparations :—

Liquor Potassii Hydratis, which contains 27 grains in 1 fluid ounce.

Potassii Permanganas.

Therapeutics. — Caustic potash is a powerful caustic. Internally, medicinal doses are antacid and diuretic; poisonous doses, irritant and corrosive.

As a caustic, when it is desired to burn deeply, caustic potash is used for snake-bites, bites of rabid animals, and for removing warts and fungous growths. Mixed with lime it is the so-called Vienna paste, a preparation not so apt to spread to the surrounding bruises. When caustic potash is employed for such purposes, care must be taken not to allow it to spread over the neighbouring tissues.

Internally, solution of caustic potash is used for the same purposes as the bicarbonate and carbonate (see Liquor Potassii Hydratis).

POTASSII IODIDUM.

Iodide of Potassium.

Formula.—KI.

Mode of Preparation.—Place 1 gallon of solution of hydrate of potassium in a glass or porcelain vessel, and add about 21 ounces of iodine in small amounts at a time with constant agitation, or a sufficient quantity to impart to the

solution a permanent brown tint. Evaporate the fluid to dryness in a porcelain dish. Pulverize the residue, and then mix the powder intimately with charcoal. Throw the mixture in small quantities at a time into a red-hot iron crucible, and, when it has been brought to a state of fusion, remove the crucible from the fire, and pour out its contents. When the fused mass has cooled, dissolve it in 2 pints of boiling distilled water, and filter through paper. Wash the filter with a little boiling distilled water, so as to dissolve what may be undissolved, and add what now goes through to the former filtrate. Then evaporate the whole until a film forms on the surface, and set it aside to cool. Drain the crystals which are formed, and dry them quickly in a warm place. Evaporate the mother-liquor, and cool in order to obtain more crystals. The salt should be preserved in a stoppered bottle.

Characters.—Iodide of potassium crystallizes in colourless, generally opaque, cubic crystals. It is readily soluble in water, and in a less degree in spirit. Generally the salt has a feebly alkaline reaction. The taste is sharp, saline, and bitter.

Tests.—An aqueous solution mixed with mucilage of starch gives a blue colour on the addition of a minute quantity of chlorine, either in the porous state or in aqueous solution. With tartaric acid it gives a crystalline precipitate. The addition of tartaric acid and mucilage of starch to an aqueous solution does not give rise to the production of a blue colour. Solution of nitrate of silver added in excess forms a yellowish-white precipitate of iodide of silver. This precipitate, when agitated with ammonia, yields by subsidence a clear liquid, in which excess of nitric acid causes very little turbidity. An aqueous solution of iodide of potassium merely gives a faint precipitate with saccharated solution of lime.

Preparations :—

Linimentum Iodi (nearly 22 grains of iodide of potassium in 1 fluid ounce).

Tinctura Iodi (nearly 11 grains of iodide of potassium in 1 fluid ounce).

Unguentum Iodi (nearly 16 grains of iodide of potassium in 1 ounce).

Therapeutics :—

Action.—Iodides of potassium and sodium are readily absorbed, and are eliminated rapidly by the kidneys, salivary glands, skin, and mucous membranes. The action of the former depends partly upon the iodine and partly upon the potassium of which it is composed. Iodine is supposed to be set free in the blood and taken up by the albuminous substances of the tissues, which thus undergo more rapid change.

Uses.—In virtue of their effect upon the metamorphosis of albuminous substances, iodides are given to promote absorption of effused fluids and solid exudations in animals. In elephantiasis or chronic weed; in pleurisy, to promote absorption of effused fluid; in glandular enlargements, especially those of a scrofulous character, and in chronic rheumatic affections, it is often prescribed. As an expectorant it is given in chronic bronchitis where there is deficient secretion. In chronic lead and mercury poisoning to eliminate the toxic agent from the system, and in dropsy, as a diuretic, iodide of potassium is a useful agent.

Externally it is sometimes employed in the making of liniments intended for the reduction of enlargements, but for this purpose it is probably not of much value.

Posology :—

Horses	...	... 1 to 3 drachms.
Cattle	...	... 1 to 4 drachms.
Sheep	...	... 20 to 40 grains.
Pigs ...	...	... 10 to 20 grains.
Dogs ...	...	... 1 to 8 grains.

POTASSII NITRAS.

Nitrate of Potassium.

Formula.—KNO_3.

Mode of Preparation. — The nitrate of potassium of commerce should be purified, if necessary, by crystallization from solution in distilled water.

Characters. — Nitrate of potassium consists of white crystalline masses or fragments of striated six-sided prisms. The salt is colourless, and gives rise to a peculiar cool saline taste without bitterness.

Tests.—If thrown on to a fire it deflagrates. If warmed with sulphuric acid and copper wire in a test-tube, nitrate of potassium evolves ruddy fumes. The sulphuric acid acting on the salt produces nitric acid, which is acted upon by the copper. An aqueous solution acidulated with hydrochloric acid yields a yellow precipitate with perchloride of platinum. It is not affected by chloride of barium nor by nitrate of silver.

Therapeutics.—Externally nitrate of potassium has a refrigerant and stimulant action. Internally it is alterative, refrigerant, and febrifuge. Toxic doses cause death by gastro-enteritis, and arrest of the circulation. When nitrate of potassium is injected into the blood it slows the pulse, lowers the temperature, and causes dyspnœa and death with convulsions. In virtue of its supposed action on the blood it is sometimes given in the specific fevers, as influenza and scarlet fever. In some inflammatory diseases, especially in laminitis, it has been administered with advantage in full doses. In inflammatory disorders of the intestinal tract, kidneys, and bladder it is not indicated. In bronchitis it is very useful in increasing the bronchial secretion, and it is also given in laryngitis.

As an alterative it is often given, and is a common

ingredient of alterative draughts, masses, and powders. As a diuretic it is given in dropsy, and when it is desired to induce a more copious secretion of urine.

Posology :—

Horses	...	... 2 drachms to 1 ounce.
Cattle	...	... 4 drachms to 1½ ounce.
Sheep	...	... ½ to 1½ drachm.
Pigs	...	... ½ to 1 drachm.
Dogs	...	... 5 to 20 grains.

POTASSII PERMANGANAS.

Permanganate of Potassium.

Formula.—$KMnO_4$.

Mode of Preparation.—Finely powder 3½ ounces of chlorate of potassium, and mix it with 4 ounces of dioxide of manganese. Place the mixture in a porcelain vessel, and add to it a solution of 5 ounces of hydrate of potassium in 4 ounces of distilled water. Evaporate the mixture to dryness in a sand-bath, stirring diligently to prevent spurting. Pulverize the residue, place the powder in a covered crucible, and then expose it to a dull red heat for an hour, or until it has assumed a semi-fused condition. Cool, pulverize, and then boil it with 1½ pints of distilled water. Let the insoluble matter subside, decant the fluid, boil again with half a pint of the water, again decant, saturate the united liquors with carbonic acid, and evaporate until a pellicle forms. Then set the liquor aside to cool and crystallize. Drain the crystalline mass which is formed, boil it in 6 ounces of distilled water, and strain through a funnel of which the throat is lightly obstructed by a little asbestos. Let the fluid cool and crystallize. Then drain and dry the crystals by placing them under a bell-jar over a vessel containing sulphuric acid.

Characters and Tests.—Permanganate of potassium exists in the form of slender prismatic crystals of a dark purple colour. The salt is inodorous, and has a sweet astringent taste. It is readily soluble in cold water. A single small crystal suffices to impart a rich purple colour to a fluid ounce of water. If this is mixed with a little rectified spirit and heated, it becomes yellowish-brown. If heated to redness the crystals decrepitate, evolving oxygen gas and leaving a black residue. If water is added to this residue, potash is extracted by it and may be recognised by its alkaline reaction, and by the fact that, when acidulated with hydrochloric acid, it yields a yellow precipitate with perchloride of platinum. Permanganate of potassium is readily discoloured by organic substances. Applied to abraded surfaces it acts as a caustic. When sulphuric acid is added to it, ozone is given off. Great care must, however, be taken in mixing these two substances, especially if heat is applied, as the most violent, startling, and dangerous explosion is liable to occur.

Preparation. — Liquor Potassii Permanganatis, which contains $4\frac{1}{2}$ grains in 1 fluid ounce.

Therapeutics.—Permanganate of potassium readily gives up oxygen, and thus it destroys organic matter. It is in virtue of its deodorizing and disinfectant properties that it is chiefly used, being very little employed for internal purposes. When mixed with cobra poison out of the body it readily destroys its poisonous nature. It has also been injected locally by M. L. Peringuey and ourselves as a strong solution in cases of bites by the puff adder, with striking results.* As a disinfectant permanganate of potassium is used as a lotion for foul wounds and sores, but it has little power as an antiseptic and disinfectant compared with

* See *Medical Press and Circular*, June, 1886, and *Veterinary Journal*, June, 1886.

bichloride of mercury and other powerful antiseptics. Solutions are also used with benefit as gargles in cases of aphthous conditions of the oral cavity, and in leucorrhœa and gonorrhœa. In foul-smelling discharges from the uterus and vagina injection of the solution is useful.

POTASSII SULPHIDUM ET POTASSII SULPHAS.

Sulphide and Sulphate of Potassium.

Synonyms.—Potassa Sulphurata; Sulphurated Potash; Hepar Sulphuris.

Mode of Preparation.—The above substance, which is more generally known as sulphurated potash, is really a mixture of tersulphide of potassium, and possibly of other sulphides of potassium in slight quantity with some sulphate of potassium. It is prepared as follows: Mix 10 ounces of powdered and dried carbonate of potassium with 5 ounces of sublimed sulphur in a warm mortar. Introduce the mixture into a Cornish or Hessian crucible. Then heat the crucible, at first gradually until effervescence has ceased, and finally to dull redness, so as to produce perfect fusion. Then pour the liquid contents of the crucible out on a clean surface, and cover them quickly with an inverted porcelain basin, so as to exclude currents of air, while solidification is taking place. The solid product should, when cold, be broken into fragments, and immediately enclosed in a green-glass bottle, which is furnished with an air-tight stopper. The reaction is probably as follows:—

$$IOS + 4K_2CO_3 = 3K_2S_3 + K_2SO_4 + 4CO_2.$$

Characters.—Sulphurated potash occurs as solid greenish fragments. If recently broken they are of a liver-brown appearance. Sulphurated potash is alkaline, and acrid to the taste. It readily forms with water a yellow solution,

which has the odour of sulphuretted hydrogen, and evolves this gas freely when excess of hydrochloric acid is added to it, sulphur being at the same time deposited. The acid fluid when boiled and filtered gives a yellow precipitate of the double chloride of platinum and potassium, when perchloride of platinum is added to it. When chloride of barium is added to another portion of the acid fluid similarly boiled and filtered, a white precipitate is produced, as with all sulphates. About 50 per cent. of sulphurated potash is soluble in rectified spirit.

Preparation.—Unguentum Potassii Sulphidi et Potassii Sulphatis.

Therapeutics.—Internally, sulphurated potash increases peristaltic action, thus being laxative in effect. It has stimulant and alterative properties, and acts also upon the respiratory mucous membrane. It has been given in cases of chronic bronchitis and in some skin diseases, and in cases of lead poisoning. Externally, the ointment is used in mange, acne, and some chronic skin diseases. As an injection into the rectum for round worms, 1 grain to the ounce of water may be used in dogs.

Posology :—

Horses	...	... ½ to 1 drachm.
Cattle	...	... ½ to 2 drachms.
Dogs	...	... 5 to 10 grains.

POTASSII SULPHAS.

Sulphate of Potassium.

Formula.—K_2SO_4.

Characters and Tests.—Sulphate of potassium exists in the form of hard, colourless, six-sided pyramids. When heated it strongly decrepitates. It is sparingly soluble in water, and insoluble in alcohol. An aqueous solution is

neutral in reaction, and gives no precipitate with oxalate of ammonium. If it is acidulated with hydrochloric acid, and chloride of barium is added, a white precipitate is produced; while if perchloride of platinum is added to the solution thus acidulated, a yellow precipitate of the double chloride of potassium and platinum is produced.

Preparation.—Pulvis Ipecacuanhæ Compositus (4 parts in 5).

Therapeutics.—Sulphate of potassium is a saline purgative, but is seldom employed, the sulphate of magnesium or that of sodium being preferred for this purpose.

PULVIS ANTIMONIALIS.

Antimonial Powder.

Mode of Preparation.—Mix thoroughly 1 part of oxide of antimony and 2 parts of phosphate of calcium.

Therapeutics.—Antimonial powder is used for pretty much the same purposes as tartar emetic as a febrifuge for the dog.

Posology:—

Dogs ... ... 3 to 8 grains.

PULVIS IPECACUANHÆ COMPOSITUS.

Compound Powder of Ipecacuanha.

Mode of Preparation.—Mix thoroughly together 1 part of ipecacuanha in powder, 1 part of opium in powder, and 8 parts of sulphate of potassium in powder. Pass the mixed powder through a fine sieve, and finally rub it lightly in a mortar. Keep the powder in a stoppered bottle.

Therapeutics.—Compound powder of ipecacuanha is used in canine practice as a sedative and diaphoretic.

Posology:—

Dogs ... ... 5 to 15 grains.

PYROXYLIN.

Pyroxylin.

Mode of Preparation.—Mix 5 fluid ounces of sulphuric acid with 5 fluid ounces of nitric acid in a porcelain mortar. Immerse 1 ounce of cotton-wool in the mixture, and stir it for 3 minutes with a glass rod, until it is thoroughly wetted by the mixture of acids. Transfer the cotton to a vessel containing water, stir it well with a glass rod, decant the liquid, pour more water upon the substance, agitate again and repeat the affusion, agitation, and decantation, until the washings no longer give a precipitate with chloride of barium. Drain the product on filtering paper, and dry in a water-bath.

Test.—Pyroxylin is readily soluble in a mixture of ether and rectified spirit. It leaves no residue when exploded by heat.

Preparation.—Collodium.

QUASSIÆ LIGNUM.

Quassia Wood.

Natural Order.—Simarubaceæ.

Characters.—The chips, shavings or raspings of the wood of Picræna excelsa. The billets or logs from which the smaller portions are cut off vary in length and size, but frequently they are as thick as a man's thigh. They are covered by a dark-grey bark. The wood is dense, tough, porous, and of a pale yellowish-white colour. The chips are inodorous, but have an intense and purely bitter taste. An infusion does not become black or bluish-black on the addition of a persalt of iron.

Preparation.—Infusum Quassiæ.

Therapeutics.—Quassia is a bitter tonic and stomachic. It is prescribed as such for debilitated animals. As an

anthelmintic it is destructive to round-worms, and may be administered by the mouth or in the form of enemata. Quassia contains no tannin.

Posology of infusion of Quassia.

Horses and cattle	... 4 to 6 fluid ounces.
Sheep and pigs	... 4 drachms to 1 fluid ounce.
Dogs ...	... 1 to 2 fluid drachms.

QUERCUS CORTEX.

Oak Bark.

Natural Order.—Cupuliferæ.

Characters.—The dried bark of the smaller branches and young stems of Quercus Robur, collected in spring, from trees growing in Britain. It occurs in quills covered with a corky layer or periderm which is smooth and of a shining silvery appearance, or may be of an ash-grey colour variegated with brown. Internally they are cinnamon-brown or brownish-red, and longitudinally striated. The fracture is tough and fibrous. The taste is very astringent, but there is no marked odour.

Therapeutics.—In virtue of the tannin it contains, oak bark has astringent properties, and is prescribed in cases of diarrhœa and dysentery. The decoction is a good form in which to administer oak bark. Externally, the decoction is used as an astringent gargle in cases of sore throat, and as a lotion for astringing wounds, and as an injection in cases of leucorrhœa.

Posology :—

Horses ...	... 2 drachms to 1 ounce.
Cattle ...	... 2 drachms to 1½ ounce.
Sheep and pigs	... ½ to 1½ drachms.
Dogs ...	... 10 to 30 grains.

QUININÆ SULPHAS.

Sulphate of Quinine.

Formula.—$[(C_{20}H_{24}N_2O_2)_2H_2SO_4]_2,15H_2O$.

Mode of Preparation.—Sulphate of quinine is the sulphate of an alkaloid prepared from the powdered bark of various kinds of Cinchona and Remijia by extraction with spirit after the addition of lime, or by the action of an alkali on an acidulated aqueous infusion, with subsequent neutralisation of the alkaloid by sulphuric acid. The resulting salt must be purified.

Characters.—Sulphate of quinine occurs in the form of filiform, silky, snow-white crystals. The taste is purely and intensely bitter. At the ordinary temperature it is soluble to the extent of 1 in about 750 parts of water, and the solution possesses a bluish tint or fluorescent appearance. It is readily soluble in water acidulated with sulphuric acid.

Tests.—A solution of sulphate of quinine gives with chloride of barium a white precipitate insoluble in nitric acid. A solution treated first with solution of chlorine and afterwards with ammonia, becomes of an emerald-green colour. A solution acted upon by ammonia yields a white precipitate of quinine which is soluble in ether and in excess of the ammonia. A solution of sulphate of quinine in sulphuric acid has a feeble yellowish tint, and undergoes no further change of colour when gently warmed. A quantity of the freshly-prepared salt weighing 25 grains should lose 3·8 grains of water by drying at 100° C. If ignited with free access of air, sulphate of quinine burns without leaving any residue. Sulphate of quinine should not contain more than 5 per cent. of sulphates of other cinchona alkaloids.

Preparation.—Ferri et Quininæ Citras (16 parts of quinine in 100).

Therapeutics:—

Action.—Quinine lessens protoplasmic amæboid movements, and destroys low animal and vegetable organisms (Brunton). It diminishes the amount of oxidation in the body. Under its influence the oxygen of the red blood corpuscles is less readily given up, and the cells themselves increase in size. The white cells are paralyzed, and the number of them visible is greatly reduced. The ozonising power of the blood is diminished if quinine be added to it. Quinine diminishes or arrests fermentation, and is powerfully antiseptic.

In healthy animals quinine has only a moderate effect in reducing the temperature, but in pyrexia, especially of the specific fevers, it has a very marked effect. On metabolism quinine has an important effect. In moderate doses it lessens the amount of nitrogenous excreta in the urine, but in fever it increases the amount of nitrogen in this excretion. Quinine seems to diminish metabolism by interfering with the oxidation of the protoplasmic elements of the body and with oxygenation. It will thus be seen that quinine reduces temperature by causing diminution of heat production, and not by affecting any means of additional loss of heat from the system. This diminution is not caused by any influence on the centres which regulate heat production, but through the tissues themselves. Furthermore, the zymotic factor in fevers, whether consisting in the growth and development of organic germs, or in a chemical ferment, is held in check, to some extent at any rate, by quinine.

On the alimentary canal, quinine has a stomachic and tonic effect. The spleen is reduced in size and becomes more firm. Moderate doses increase the force of the circulation, whereas large doses diminish the blood-pressure,

dilating the vessels, diminish the force and frequency of the systole, and lengthen the diastole. These effects are attributable to a direct action of quinine on the cardiac ganglia and muscle, on the vessels' walls, and on the vaso-motor centre, which is partly paralyzed. The pneumogastric nerve is paralyzed by toxic doses, though it is little influenced by moderate amounts.

Respiration is accelerated by moderate doses, but is diminished by large ones, through paralysis of the respiratory centre in the medulla oblongata. In quinine poisoning death occurs through failure of respiration caused by paralysis of this centre. Small doses are tonic to the nervous system, but large doses cause derangement of sight and hearing, and weakness of the muscles. Very large doses cause delirium and convulsions, and if in sufficient amount, lead to a fatal result. The brain is stimulated by small doses, and depressed by large ones. On the spinal cord, quinine acts by diminishing reflex excitability.

Uses.—Quinine is useful as a tonic in debility, more especially in animals suffering from chronic disease or recovering from acute maladies. As a local application it is seldom employed in veterinary practice, but weak solutions have been recommended in treating conjunctivitis in human practice. As an antipyretic and antiseptic, quinine has been given in cases of influenza, strangles, scarlet fever, purpura, and other fevers in horses, and in the treatment of distemper in dogs. In canine practice, quinine is often prescribed as a tonic in cases of debility. In neuralgic affections, quinine is given as an antiperiodic with great benefit. The other alkaloids are often substituted for quinine, more especially in equine practice. Quinidine, cinchonine, and cinchonidine, are favourite substitutes. Quinetum and its sulphate—which consist of the mixed alkaloids of cinchona bark, and contain 50 to 70 per cent.

of cinchonidine, with some quinine and cinchona—are much cheaper than quinine, and appear to act as well as quinine. The doses of quinetum, sulphate of quinetum, and quinidine, are the same as those of quinine.

Posology :—

Horses ...	... 15 to 40 grains.
Cattle ...	... 30 grains to 1 drachm.
Sheep ...	... 5 to 15 grains.
Pigs ...	... 5 to 10 grains.
Dogs ...	... 1 to 5 grains.
Cats ...	... 1 to 2 grains.

RESINA.

Resin.

Natural Order.—Coniferæ.

Mode of Preparation.—Resin is the residue left after the distillation of the oil of turpentine from the crude oleo-resin (turpentine) of various species of Pinus.

Characters.—Resin is translucent, yellowish, compact, brittle, pulverizable. The odour and taste are faintly terebinthinate. Resin is easily fusible, and burns with a dense yellow flame and much smoke.

Preparations :—

Emplastrum Picis.
Unguentum Terebinthinæ.

Therapeutics.—Resin applied externally has stimulant and astringent properties. Internally it is stimulant, astringent, and diuretic. It is much used for making plasters, while the ointment of resin is a stimulating application for wounds and ulcers. Internally, resin is sometimes given as a diuretic in equine practice.

Posology :—

Horses and cattle	... 2 to 5 drachms.
Sheep and pigs	... 1 to 2 drachms.
Dogs ...	... 20 to 30 grains

RHEI RADIX.

Rhubarb Root.

Natural Order.—Polygonaceæ.

Mode of Preparation.—The root of Rheum palmatum, Rheum officinale, and probably other species, deprived more or less completely of the bark, sliced, dried, and prepared in China and Thibet.

Characters.—Rhubarb root exists in somewhat cylindrical, barrel-shaped, conical, plano-convex, or irregular pieces. The external surface is covered with a bright yellowish-brown powder, round or somewhat angular, smooth or more or less wrinkled, and marked beneath the powder with reddish-brown or dark rusty-brown lines, intermixed in a yellowish-brown substance, and frequently presenting small scattered star-like spots. The pieces are frequently bored with a hole, which may or may not contain the remains of the cord used to suspend them to dry. Rhubarb root is hard and compact. The fracture is uneven, the broken surface presenting a marbled appearance, and in some cases exhibiting a ring of star-like spots. The odour is peculiar and somewhat aromatic. The taste is bitter, and slightly astringent. When chewed, rhubarb feels gritty between the teeth.

Rhubarb root contains oxalate of lime, and tannic and chrysophanic acids.

Therapeutics.—Rhubarb is a bitter, stomachic, and intestinal astringent in small doses. It is a stimulator of the movements of the intestine, and of the functions of the liver in large doses. On horses and cattle, however, it is of very little effect as a purgative. Its action is confined to the alimentary tract. In dogs it is usually prescribed with jalap, or calomel, or grey powder.

Posology :—

As a stomachic.

Horses	...	... 1 ounce.
Cattle ...	...	... 1 to 2 ounces.
Sheep ...	...	... 2 to 3 drachms.
Pigs ...	...	... 1 to 2 drachms.
Dogs ...	...	... 10 to 30 grains.

As a purgative.

Dogs ...	...	... 1 to 3 drachms.

ROSÆ GALLICÆ PETALA.

Red-Rose Petals.

Natural Order.—Rosaceæ.

Mode of Preparation.—The fresh and dried unexpanded petals of Rosa gallica (the red or French rose) are obtained from plants cultivated in Britain. The flowers are collected when about the size of a nutmeg. The white claws are cut off, and they are then dried. In order to preserve the colour the petals should be kept away from the light.

Characters.—Red-rose petals are velvety, and occur usually in little cone-like masses. Sometimes they are separate and crumpled. The colour, purplish-red, is retained. The odour, which is fragrant and rose-like, is especially developed by the drying. The taste is bitterish, feebly acid, and astringent.

Composition.—The petals contain a red colouring matter (Quercitrin), tannic or gallic acid, fat, sugar, acids, and a trace of volatile oil.

Tests.—An infusion becomes bright red with acids, and green with alkalies.

Preparation.—Confectio Rosæ Gallicæ (1 part of fresh petals to 3 of refined sugar).

SABINÆ CACUMINA.

Savin Tops.

Natural Order.—Coniferæ.

Mode of Preparation.—The fresh tops of Juniperus Sabina are collected in spring, from plants cultivated in Britain, and dried.

Characters.—The twigs are densely covered with minute imbricated dark green (or, when dried, yellowish-green) leaves pressed close to the stem.* The leaves have a large, oval, depressed, central gland on their back.

When the twigs are rubbed or bruised a strong and peculiar odour is noticeable. The taste is acrid and bitter.

Composition.—The activity is due to the volatile oil, oleum sabinæ ($C_{10}H_{16}$). A resin and gallic acid are also present.

Therapeutics.—Externally savin is irritant and vesicant. It is occasionally employed as a stimulant for wounds, and for promoting the discharge from blistered surfaces. Internally large doses act as gastro-intestinal irritants. Being carried through the organs and excreted like oil of turpentine, medicinal doses have a stimulating effect on the genito-urinary organs, acting on the kidneys as a diuretic and on the pregnant uterus as an ecbolic. Being so irritating, savin is never employed for causing expulsion of the fœtus. In veterinary practice, on account of its irritant qualities, savin is very little used; but the oil is sometimes employed as an anthelmintic in horses and cattle.

For external purposes the ointment or decoction of savin

* The small leaves in Savin-tops are pressed close to the stem, while the leaves of Juniper-tops, which are longer and more pointed, stand out at right angles to the stem.

is employed. The latter can be made of 1 part of savin, 2 parts of spirit, and 9 parts of water.

Preparation.—Oleum Sabinæ (prepared from the fresh tops).

Posology :—

Horses and cattle ... 2 to 3 fluid drachms.

SALICINUM.

Salicin.

Formula.—$C_{13}H_{18}O_7$.

Natural Order.—Salicaceæ.

Mode of Preparation.—Salicin is a crystalline glucoside obtained by treating the bark of Salix alba and other species of Salix, and the bark of various species of Populus with hot water, removing tannin and colouring matter from the decoction, evaporating, purifying, and re-crystallizing.

Characters. — Salicin consists of colourless or white shining crystals. The taste is very bitter. At the ordinary temperature salicin is soluble in about 28 parts of water or in 65 parts of spirit. It is insoluble in ether.

Tests.—Salicin is coloured red by sulphuric acid. A small quantity of salicin if heated with a little red chromate of potassium, a few drops of sulphuric acid and some water, yields vapours of an oil which has the odour of meadow-sweet.

When heated, salicin melts, and emits vapours having the odour of meadow-sweet. If ignited in air salicin leaves no residue.

Therapeutics.—Salicin is given for the same purposes as the salicylates (see Salicylic Acid). It has a similar though less powerful action, which, it may be remarked, causes less cardiac and vascular depression. The dose is the same as that of salicylic acid.

SANTONICA.

Santonica.

Natural Order.—Compositæ.

Characters.—The dried unexpanded flower-heads or capitula of Artemisia maritima, var. Stechmanniana (of which Russia is the habitat), are about one-tenth of an inch in length, obtuse and oblong-ovoid in shape, pale greenish-brown in colour, and nearly smooth. In general appearance they resemble seeds, and hence santonica has been called worm-seed. Each flower-head consists of an external involucre, composed of from 12 to 18 imbricated scales or bracts, provided with a broad, thick, yellowish-green mid-rib. Enclosed within this are 3 to 5 somewhat tubular florets. The odour, which is especially marked when santonica is rubbed, is strong, peculiar, and somewhat like camphor. The taste also is camphoraceous and bitter.

Preparation.—Santoninum.

SANTONINUM.

Santonin.

Formula.—$C_{15}H_{18}O_3$.

Characters.—Santonin is a crystalline principle obtained from Santonica. It exists in flat rhombic prisms, is feebly bitter in taste, and fuses and sublimes when gently heated. Santonin should be colourless, but is often yellow as the result of the action of sunlight. It is not dissolved by diluted mineral acids, scarcely at all soluble in cold water, sparingly in boiling water, but abundantly in chloroform and in boiling rectified spirit. If added to warm alcoholic solution of hydrate of potassium, it imparts to it a violet-red colour. Ignited with free access of air, it burns without leaving any residue.

Therapeutics.—Santonine is an anthelmintic for round-worms, but is not destructive to tapeworms. It is of greater efficacy in horses than in dogs. It is best given to the dog in a little butter placed at the back of the mouth, or in the form of a ball after fasting. An aperient, such as 2 to 4 drachms of castor oil or a dose of calomel, should be administered to the dog about four or five hours after the santonine is given.

Posology:—

Horses	...	... 20 to 40 grains.
Dogs ...	...	... 2 to 7 grains.

SAPO MOLLIS.

Soft Soap.

Characters.—This soap, which is made with potash and olive oil, is of a yellowish colour. It is without odour, and of a gelatinous consistence. Soft soap is soluble in rectified spirit, and does not impart an oily stain to paper. When incinerated it yields an ash which is highly deliquescent.

Preparation.—Linimentum Terebinthinæ (nearly 2 parts in $17\frac{1}{2}$).

SCILLA.

Squill.

Natural Order.—Liliaceæ.

Mode of Preparation.—The bulb of Urginea Scilla is divested of its dry membranous outer scales, cut into slices, and dried. It is obtained from the Mediterranean coasts.

Characters.—The slices as generally seen are flattish or somewhat four-sided, curved, yellowish-white or slightly pinkish, from about 1 to 2 inches in length, translucent, inodorous, of a mucilaginous and very bitter taste with a slight tinge of sweetness, brittle and easily pulverizable if quite dry, but tough and flexible when moist.

Composition.—The active principle is a glucoside, scillitoxin, or scillaïn.

Preparations :—

Acetum Scillæ, which contains nearly 2½ ounces of squill to 1 pint.

Oxymel Scillæ.

Therapeutics.—See Acetum Scillæ.

SEVUM PRÆPARATUM.

Prepared Suet.

Natural Order.—Ruminantia.

Mode of Preparation.—The internal fat of the abdomen of the sheep, Ovis Aries, is purified by melting and straining.

Characters.—Prepared suet is white, smooth, almost without odour, and fusible at 39·4° C.

Preparation.—Unguentum Hydrargyri.

Therapeutics.—Prepared suet is sometimes used in the preparation of ointments in the place of lard.

SINAPIS.

Mustard.

Natural Order.—Cruciferæ.

Characters.—Black and white mustard-seeds powdered and mixed, yield a greenish yellow powder with an acrid, bitterish, oily, pungent taste. When dry the powder is without scent, but when moist exhales a pungent, penetrating, peculiar odour, which is very irritating to the nostrils and eyes.

Test.—A decoction when cooled is not made blue by tincture of iodine, as it would be if adulterated with starch.

Preparations :—

Cataplasma Sinapis.

Oleum Sinapis.

Therapeutics. — When applied externally, mustard is rubefacient, stimulant, and vesicant. Compared with cantharides, it is more rapid, but more transient in effect. Unlike cantharides, it is not liable to inflame the kidneys. It is very extensively employed as a counter-irritant in veterinary practice in cases of inflammation of the throat, larynx, bronchi, lungs, and pleura. In colic, acute dyspepsia, gastritis, and enteritis, it is very serviceable in abating the pain. For relieving pain in muscular rheumatism it is also employed. As a cardiac-vascular stimulant, it is applied over the region of the heart in syncope, coma, or asphyxia, whether from disease or poisoning. Mustard is made into a paste with hot water, to which ammonia solution or oil of turpentine may be added. Internally, mustard is stimulant, stomachic, carminative, diuretic, and aperient. It is rarely administered except as an emetic for dogs and cats.

Posology :—

As a stomachic.

Horses	...	... 2 to 4 drachms.
Cattle	...	... 4 drachms to 1 ounce.
Sheep	...	... 1 to 2 drachms.
Pigs	...	... ½ to 1 drachm.

As an emetic.

Dogs	...	... 2 drachms.
Cats	...	... 1 drachm.

SODII BICARBONAS.

Bicarbonate of Sodium.

Formula.—$NaHCO_3$.

Mode of Preparation.—Bicarbonate of sodium is obtained by saturating carbonate of sodium with carbonic acid gas,

or by acting on chloride of sodium with bicarbonate of ammonium.

Characters.—The salt is seen in the form of powder, or in that of small opaque irregular scales. Bicarbonate of sodium is white, and has a saline and not unpleasant taste. It imparts a yellow colour to flame. In diluted hydrochloric acid, bicarbonate of sodium dissolves with much effervescence, forming a solution which, when perchloride of platinum is added to it, yields no precipitate. A solution of bicarbonate of sodium in cold water yields, with solution of perchloride of mercury, a precipitate which is white, not coloured. When excess of nitric acid is added to an aqueous solution, scarcely any precipitate is produced by chloride of barium or nitrate of silver.

Therapeutics.—Bicarbonate of sodium is antacid, and when taken internally increases the alkalinity of the blood. Its action resembles that of bicarbonate of potassium, but the salts of sodium have not the depressing action of the salts of potassium, and may consequently be given for a greater length of time. The salts of sodium are much less diffusible than those of potassium, and, unlike them, have no specific influence on any organ. Internally, bicarbonate of sodium is given in flatulence and dyspepsia. In acute rheumatism its effect is not so beneficial as that of the potassium salt. As an external application, solutions of about 2 or 3 grains to the ounce of water are useful in abating the itching in acute eczema and prurigo.

Posology:—

Horses ...	... ½ to 1 ounce.
Cattle ...	... ½ to 1½ ounces.
Sheep and pigs	... 1 to 2 drachms.
Dogs ...	... 7 to 40 grains.

SODII BORAS.

Borate of Sodium.

Synonyms.—Sodii Diboras; Borax; Biborate of Sodium.
Characters, etc.—Vide Borax.

SODII BROMIDUM.

Bromide of Sodium.

Formula.—NaBr.

Mode of Preparation. — Bromide of sodium may be obtained by a process similar to that by which bromide of potassium is made, solution of hydrate of sodium being used in the place of solution of hydrate of potassium, and crystallization being conducted from warm solutions.

Characters.—Bromide of sodium is a granular white powder composed of small monoclinic crystals. It is slightly deliquescent, inodorous, and possesses a sharp and somewhat peculiar saline taste. It is readily soluble in less than twice its weight of water, much less soluble in spirit.

Tests.—To a flame the salt imparts an intense yellow colour. When an aqueous solution of bromide of sodium is mixed with a little chlorine water, bromine is set free and chloride of sodium formed. If now it is shaken with chloroform, the latter takes up the bromine, and thereby acquires a red colour.

An aqueous solution of bromide of sodium mixed with mucilage of starch, and a little solution of chlorine or of bromine, should not exhibit any blue colour, thus proving the absence of iodide of sodium as an impurity.

Therapeutics.—Bromide of sodium is given for the same purposes in the same doses as the corresponding salt of potassium. It has not the depressing action which the latter salt possesses in virtue of the potassium it contains.

SODII CARBONAS.

Carbonate of Sodium.

Formula.—$Na_2CO_3,10H_2O$.

Mode of Preparation.—Carbonate of sodium is generally obtained from chloride of sodium, either by reaction with bicarbonate of ammonium and subsequent ignition, or by conversion into sulphate of sodium, and the subsequent action of heat on a mixture of the sulphate with carbon and carbonate of calcium.

Characters and Tests.—Carbonate of sodium exists in transparent, colourless, laminar crystals of a rhombic shape. The salt is efflorescent, and has a harsh alkaline taste, and a strong alkaline reaction. Like all salts of sodium and the metal sodium itself, it imparts a yellow colour to a colourless flame. It dissolves with effervescence in diluted hydrochloric acid, giving off carbonic acid gas, and forming a solution of chloride of sodium which does not give a precipitate with solution of perchloride of platinum. If heated it fuses, and then dries up, losing 63 per cent. of its weight. If excess of nitric acid is added, only very slight precipitation results from the subsequent addition of chloride of barium or nitrate of silver. Thus the absence of a sulphate or chloride is proved.

Preparations:—

Liquor Sodæ Chlorinatæ.
Liquor Sodii Hydratis.
Sodii Arsenias.
Sodii Bicarbonas.
Sodii Phosphas.

Therapeutics.—Carbonate of sodium is given for the same purposes, but in less doses than bicarbonate of sodium. (See Sodii Bicarbonas.)

Posology :—

Horses and cattle	... 2 to 6 drachms.
Sheep ...	... ½ to 1 drachm.
Pigs ...	... ½ to 1 drachm.
Dogs ...	... 15 to 25 grains.

SODII CHLORIDUM.

Chloride of Sodium.

Synonym.—Common Salt.

Formula.—NaCl.

Characters.—Chloride of sodium exists in small white crystalline grains, or transparent cubic crystals. It is free from moisture, has a purely saline taste, imparts a yellow colour to flame, and is soluble in water.

Tests.—An aqueous solution is not precipitated by perchloride of platinum, but gives with nitrate of silver a white precipitate of chloride of silver, which is soluble in ammonia, but insoluble in nitric acid.

Preparations :—

Acidum Hydrochloricum.
Hydrargyri Perchloridum.
Hydrargyri Subchloridum.

Therapeutics.—Chloride of sodium is an important element of food, but it is not very largely employed medicinally. It is a good practice to always keep rock salt in the manger, or trough, as horses, cattle, and sheep are thus maintained in a more healthy condition. Horses are rendered less liable to become infested with intestinal worms by this practice. Small doses of salt are stomachic and alterative, larger ones are laxative or cathartic. As an emetic for dogs, from 1 to 3 drachms dissolved in warm water are generally requisite. It is a good plan to add 1 grain of sulphate of zinc when it is desired to induce more rapid

emesis. As an anthelmintic, salt is often given internally to cattle and sheep; and in the form of enemata, 2 ounces dissolved in a pint of water prove useful in dislodging rectal worms in horses. As a purgative, salt is also sometimes given to cattle and sheep. Externally, solutions of salt are slightly stimulant, and are of value as antiseptics.

Posology:—

As an emetic.

Dogs	...	... 1 to 3 drachms.

As a stomachic and alterative.

Horses	...	... ½ to 1 ounce.
Cattle	...	... 2 to 3 ounces.
Sheep	...	... 2 to 4 drachms.
Pigs	...	... 1 drachm (not more).
Dogs	...	... 10 to 20 grains.

As an anthelmintic and cathartic.

Cattle	...	... 10 to 20 ounces.
Sheep	...	... 1 to 3 ounces.

SODII HYDRAS.

Hydrate of Sodium.

Synonyms.—Soda Caustica; Caustic Soda.

Formula.—NaHO (Hydrate of sodium generally contains some impurities).

Mode of Preparation.—Boil down rapidly in a silver or clean iron vessel 2 pints of solution of hydrate of sodium, until a fluid of oily consistence, a drop of which when removed on a warm glass rod solidifies on cooling, is produced. Pour this fluid on a clean silver or iron plate or into moulds, and, as soon as it has solidified, break it into pieces, and preserve it in stoppered green-glass bottles.

Characters.—Hydrate of sodium is hard, greyish-white, very alkaline, and, like hydrate of potassium, corrosive. Like all substances containing sodium, it imparts a yellow colour to a colourless flame. An aqueous solution acidulated with nitric acid yields merely scanty white precipitates with nitrate of silver and with chloride of barium, thereby proving the absence of any chloride, and of any sulphate or of the corresponding acids.

Preparation. — Liquor Sodii Hydratis, which contains 18·8 grains in 1 fluid ounce.

Therapeutics.—Caustic soda is sometimes used as a caustic, like caustic potash, but is less powerful.

SODII IODIDUM.

Iodide of Sodium.

Formula.—NaI.

Mode of Preparation.—Iodide of sodium may be obtained by a process similar to that by which iodide of potassium is produced, except that solution of hydrate of sodium is used in place of solution of hydrate of potassium.

Characters.—Iodide of sodium is a dry, white, crystalline, deliquescent powder, possessing a saline and somewhat bitter taste. It is readily soluble both in water and in spirit.

Tests.—An aqueous solution is neutral in reaction, and, when mixed with mucilage of starch, it yields a blue colour on the addition of a little chlorine. The salt imparts an intense yellow colour to a flame. The addition of tartaric acid and mucilage of starch to an aqueous solution does not produce a blue colour. Solution of nitrate of silver added in excess gives a yellowish-white precipitate of iodide of silver, which, when well shaken with diluted solution of ammonia, yields by subsidence a clear liquid in which excess of nitric acid causes very little turbidity. An

aqueous solution of iodide of sodium is only faintly precipitated by the addition of saccharated solution of lime.

Therapeutics.—Iodide of sodium is employed for the same purposes as iodide of potassium. It apparently irritates the stomach less than the salt of potassium, and may be given in somewhat larger doses.

SODII SALICYLAS.

Salicylate of Sodium.

Formula.—$(NaC_7H_5O_3)_2,H_2O$.

Mode of Preparation.—Salicylate of sodium is obtained by the action of salicylic acid on either carbonate of sodium or on hydrate of sodium.

Characters.—Salicylate of sodium exists in small, colourless or nearly colourless crystalline scales. It is inodorous, and has a sweetish saline taste. It is slightly soluble in alcohol, readily in water. In cold sulphuric acid it dissolves without colouration or effervescence.

Tests.—The solutions are neutral or faintly acid in reaction. When ignited the salt evolves inflammable vapours, and a white residue remains, which effervesces with acids and imparts an intense yellow colour to flame. Perchloride of iron added to a concentrated solution gives it a reddish-brown colour. If added to a diluted solution perchloride of iron renders it violet. If an aqueous solution be acidulated with nitric acid, and the precipitate be dissolved by rectified spirit, the mixture is not made more than faintly opalescent by chloride of barium or by nitrate of silver, thus indicating the absence of a sulphate or a chloride.

Therapeutics.—The action of salicylate of sodium is very like that of salicylic acid,* but the salt of sodium has no destructive power over low organisms. It is a very powerful

* *Vide* Acidum Salicylicum.

antipyretic, and is especially valuable in acute rheumatism and other febrile conditions.

Posology:—

Horses and cattle	... 2 to 6 drachms.
Sheep and pigs ...	... 20 to 30 grains.
Dogs	... 10 to 20 grains.

SODII SULPHAS.

Sulphate of Sodium.

Synonym.—Glauber's Salt.

Formula.—$Na_2SO_4,10H_2O$.

Mode of Preparation.—Sulphate of sodium may be obtained from the residue left in the manufacture of hydrochloric acid from chloride of sodium, by neutralising it with carbonate of sodium, and crystallizing from solution in water.

Characters.—Sulphate of sodium exists in transparent oblique prisms. The salt has a saline and bitter taste, effloresces on exposure to the air, is soluble in water, but insoluble in spirit. If exposed to heat in a porcelain crucible sulphate of sodium loses 55·9 per cent. of water.

Tests.—The salt imparts a yellow colour to flame.

Therapeutics.—Sulphate of sodium has a similar action as a purgative to that of sulphate of magnesium. Being less reliable than the latter salt, it is not much used, excepting as a cathartic for cattle. It has also alterative and diuretic properties. In the dog it causes emesis as well as catharsis, but it is seldom or never employed for this animal.

Posology:—

Cattle	... 15 to 20 ounces.
Sheep	... 2 to 4 ounces.

SODII SULPHIS.

Sulphite of Sodium.

Formula.—$Na_2SO_3,7H_2O$.

Mode of Preparation.—Sulphite of sodium is obtained by the action of sulphurous acid on carbonate of sodium or on hydrate of sodium.

Characters.—Sulphite of sodium exists in colourless, transparent, monoclinic prisms. It effloresces in dry air, is inodorous, and has a cooling, saline, and sulphurous taste. The salt is readily soluble in water, and very soluble in spirit. An aqueous solution has a neutral or faintly alkaline reaction, imparts an intense yellow colour to flame, and if treated with hydrochloric acid evolves sulphurous oxide gas, but does not become cloudy.

Therapeutics.—Sulphite of sodium is antiseptic and deodorant. It evolves sulphurous acid on addition of hydrochloric acid to the aqueous solution when ingested into the stomach. It has been very extensively administered in veterinary practice in septic diseases, such as the specific fevers, as influenza, scarlet fever, strangles, purpura, and anthrax in horses; pleuro-pneumonia, cattle plague, foot and mouth disease and anthrax in cattle; in foot and mouth disease and anthrax in sheep; in swine fever in pigs; and in pyæmia and septicæmia in various animals. Although this agent has been so extensively given, there is still a difference of opinion regarding its value in septic diseases. It is often prescribed as a preventive against invasion by the specific diseases, especially anthrax. In foot and mouth disease it is unquestionably of great value. (See Mr. J. B. Gresswell's article in the *Veterinarian* and *Veterinary Journal*, January, 1884, on the action of this agent.

Posology :—

Horses	...	... ½ to 1 ounce.
Cattle ...	...	... ½ to 1 ounce.
Sheep ...	...	... 1 to 2 drachms.
Pigs ...	...	... ½ to 1 drachm.
Dogs ...	...	... 10 to 20 grains.

SODII SULPHOCARBOLAS.

Sulphocarbolate of Sodium.

Formula.—$NaC_6H_5SO_4,2H_2O$.

Mode of Preparation.—Sulphocarbolate of sodium is obtained by dissolving carbolic acid in excess of sulphuric acid, supersaturating the liquid with carbonate of barium, filtering, and treating the filtrate with carbonate of sodium until no more precipitation occurs. The filtrate from this mixture yields on evaporation crystals of sulphocarbolate of sodium.

Characters.—Sulphocarbolate of sodium exists in colourless transparent monoclinic prisms. The salt is odourless, or nearly so, and has a cooling, saline, and somewhat bitter taste. It is readily soluble in water, and less soluble in spirit. The solutions are neutral in reaction.

Tests.—If ignited, the salt gives off vapours of carbolic acid, and leaves a residue, the solution of which in water gives with chloride of barium a white precipitate, which is insoluble in hydrochloric acid. It imparts an intense yellow colour to flame. The diluted aqueous solution is rendered violet by perchloride of iron. It should not at once be rendered turbid by chloride of barium.

Therapeutics.—Sulphocarbolate of sodium is a safe and useful antiseptic, and has also alterative properties.

It has been given in indigestion in horses, in flatulent dyspepsia in dogs, and in tympanitis in cattle. In influenza in horses it is largely given by Mr. J. B. Gresswell, who also recommends it in tabes mesenterica in cattle.

Posology:—

Horses	...	... 1 to 2 drachms.
Cattle ...	...	... 2 to 3 drachms.
Dogs ...	...	... 5 to 15 grains.

SPIRITUS ÆTHERIS.

Spirit of Ether.

Mode of Preparation.—Mix 10 fluid ounces of ether with 1 pint of rectified spirit.

Test.—The specific gravity is 0·809.

Preparation.—Tinctura Lobeliæ Ætherea.

Therapeutics.—Spirit of ether is given in flatulent and painful dyspepsia in dogs.

Posology:—

Dogs	...	... 20 minims to 1 drachm.

SPIRITUS ÆTHERIS NITROSI.

Spirit of Nitrous Ether.

Synonym.—Spiritus Ætheris Nitrici.

Composition.—Spirit of nitrous ether contains nitrous compounds, aldehyd, and other substances.

Characters.—Spirit of nitrous ether is transparent and nearly colourless, but with a slight yellow tinge, mobile, inflammable, possessing a peculiar penetrating apple-like odour, and a sweetish cooling sharp taste.

Tests.—The specific gravity is about 0·8425. If shaken with a little bicarbonate of sodium, spirit of nitrous ether does not effervesce, or does so only feebly. If it is agitated in a test-tube with a strong solution of sulphate of iron, and a few drops of strong sulphuric acid are poured down the sides of the tube, a deep olive-brown or black zone is produced, which widens as the tube is gently shaken.

Therapeutics.—Spirit of nitrous ether is a diffusible stimulant, carminative, and antispasmodic. It lowers arterial tension, and by relaxing the renal vessels it acts as a diuretic. It has also antiseptic powers in febrile conditions, diminishing the production of heat in the system by its action on the blood and by increasing the loss of heat through the kidneys, and also by its diaphoretic action on the skin.

It is administered as an antispasmodic and carminative in flatulent dyspepsia, hoven, and in colic of the spasmodic or flatulent variety. As a febrifuge, it is often prescribed with solution of acetate of ammonium and other remedies in catarrh and other febrile conditions. As a diffusible stimulant, it is also frequently given to horses recovering from influenza and other debilitating diseases. As a diuretic, it is generally given with oil of turpentine, or oil of juniper.

Posology :—

Horses	... 1 to 2 fluid ounces.
Cattle ...	... 2 to 4 fluid ounces.
Sheep ...	... 2 to 4 fluid drachms.
Pigs ...	... 1 to 2 fluid drachms.
Dogs ...	... 20 to 40 minims.

SPIRITUS AMMONIÆ AROMATICUS.

Aromatic Spirit of Ammonia.

Synonym.—Sal volatile.

Mode of Preparation.—Place 4½ fluid drachms of volatile oil of nutmeg, and 6½ fluid drachms of oil of lemon, and 6 pints of rectified spirit with 3 pints of water in a retort. Distil 7 pints, and then distil and separately collect an additional 9 fluid ounces. Place these 9 fluid ounces of

distillate, together with 4 ounces of carbonate of ammonium and 8 fluid ounces of strong solution of ammonia, in a bottle which is capable of holding rather more than a pint. Cork the bottle securely, and gently warm it in a water-bath to 60° C., shaking from time to time until all the salt has dissolved. Filter if necessary, when cold, through a little cotton-wool, and gradually mix the filtrate with the 7 pints of distilled spirit. The product should measure 1 gallon.

Tests.—The specific gravity should be 0·896.

Therapeutics.—Aromatic spirit of ammonia is not much employed in veterinary practice, but for the smaller animals especially it is a very convenient preparation. (See Solution of Ammonia.)

Posology :—

Horses	... ½ to 1 fluid ounce.
Cattle ...	... ½ to 2 fluid ounces.
Sheep ...	... 2 to 4 fluid drachms.
Pigs ...	... 1 to 2 fluid drachms.
Dogs ...	... 10 to 20 minims.

SPIRITUS CAMPHORÆ.

Spirit of Camphor.

Mode of Preparation.—Dissolve 1 ounce of camphor in 6 fluid ounces of rectified spirit.

Therapeutics.—Spirit of camphor is a convenient preparation for dogs.

Posology :—

Dogs ...	... 10 to 20 minims.

SPIRITUS CHLOROFORMI.

Spirit of Chloroform.

Synonyms.—Chloric Ether; Spirit of Chloric Ether.

Mode of Preparation.—Dissolve 1 fluid ounce of chloroform in 19 fluid ounces of rectified spirit.

Test.—The specific gravity is 0·871.

Therapeutics.—See Chloroform.

Posology:—

Horses	... 1 to 2 fluid ounces.
Cattle...	... 2 to 4 fluid ounces.
Sheep ...	... 2 to 4 fluid drachms.
Pigs ...	... 2 to 4 fluid drachms.
Dogs ...	... $\frac{1}{2}$ to 1 fluid drachm.

SPIRITUS JUNIPERI.

Spirit of Juniper.

Mode of Preparation.—Dissolve 1 fluid ounce of oil of juniper in 49 fluid ounces of rectified spirit.

Posology:—

Dogs ...	... $\frac{1}{2}$ to 1 fluid drachm.

SPIRITUS METHYLATUS.

Methylated Spirit.

Composition.—Methylated spirit consists of 90 per cent. of spirit of wine, and 10 per cent. of methylic alcohol, CH_3HO.

Uses.—Methylated spirit is used as a substitute for rectified spirit for external purposes, and in the preparation of those tinctures which are employed externally.

SPIRITUS RECTIFICATUS.

Rectified Spirit.

Composition.—Rectified spirit is composed of alcohol, C_2H_5HO, with 16 per cent. of water.

Mode of Preparation.—It is obtained by the distillation of fermented saccharine fluids.

Characters.—Rectified spirit is a colourless fluid, transparent, very mobile and inflammable, affording a characteristic pleasant odour, and a strong spirituous burning taste. It burns with a blue flame without smoke.

Tests.—The specific gravity is 0·838. Rectified spirit remains clear when diluted with distilled water. A little rubbed on the back of the hand leaves no unpleasant smell when the spirit has evaporated.

Preparations.—Many tinctures are made with rectified spirit.

Amount of absolute alcohol by weight in substances containing it.

Spiritus Rectificatus, 84 per cent.
Spiritus Tenuior, 49 per cent.
Spiritus Vini Gallici (Brandy), 39 to 47 per cent.
Spiritus Frumenti (Whisky), 44 to 50 per cent.
Rum and Gin, about 40 to 50 per cent.
Port, Sherry, and Madeira, about 14 to 18 per cent.
Beer, about 3 to 5 or more per cent.

Therapeutics.—Externally alcohol is antiseptic and disinfectant. It is also refrigerant, rubefacient, and stimulant. It is extensively used in the preparations of tinctures, ethers, and extracts. As a refrigerant it is a common ingredient of so-called evaporating or cooling lotions, but for this purpose methylated spirit serves the purpose equally as well. A good cooling lotion may be made of 1 ounce of

rectified or methylated spirit, ½ ounce of chloride of ammonium, and 1 pint of water.

Internally alcohol is a diffusible stimulant and a promoter of gastric digestion, diuretic and diaphoretic. Inasmuch as it is a source of energy and heat, it is to be regarded as a food. It diminishes oxidation of the tissue elements. The circulatory and nervous activity are increased markedly, but depression follows the stage of increased vital activity. The voluntary faculties first become dull, and then, if the dose taken be large, they are arrested, the muscles become paralyzed, and when the amount injected is still more, the depression of the respiratory and circulatory centres leads to stertorous breathing, circulatory failure, and death. The effect of alcohol on the nervous structures is partly due to dilation of the bloodvessels and partly to a direct action upon the nerve-cells. The temperature of the body is lowered by alcohol.

Alcohol is most frequently administered to the larger animals in the form of whisky, gin, rum or brandy, to the smaller ones in the form of wine. As a stimulant it is of great service in connection with its action on the heart. In cases of acute pulmonary congestion in horses, whether blood be abstracted or not, the administration of whisky or brandy is of the greatest importance. In cases of horses struck down as it were suddenly by severe forms of influenza, such as pink-eye, alcohol is the chief remedy on which to rely. In many other epizootic diseases, both in the early and later stages in horses, it is commonly given. As a tonic and stimulant, alcohol is given in many chronic forms of disease; and in the later stages of acute diseases, in debility, loss of appetite and anæmia, it is often given. In colic of the spasmodic or flatulent variety it acts by controlling the spasm and dispelling the accumulation of gas.

In poisoning by hellebore it is of the greatest value, and is prescribed with spirit or solution of ammonia. (See Mr. J. B. Gresswell on hellebore poisoning in the *Veterinary Journal* and *Veterinarian*, May, 1885.) In opium and aconite poisoning, and likewise in the case of the ingestion of other powerfully sedative agents, it is a remedy of the first importance. In cases of chill, alcohol is prescribed with solution of acetate of ammonium and spirit of nitric ether. Alcohol has been given also in cases of tetanus.

In puerperal apoplexy in cows, alcohol, in the form of gin or whisky, is prescribed with solution of ammonia, the mixture being given at frequent intervals. With the hypodermic injection of ergotin and the hot pack this method of treatment is very satisfactory.

Posology :—

Rectified spirit.

Horses	...	... 1 to 3 fluid ounces.
Cattle	...	... 2 to 5 fluid ounces.
Sheep	...	... ½ to 1 fluid ounce.
Pigs	...	... 2 to 4 fluid drachms.
Dogs	...	... 1 fluid drachm.

Whisky, gin, or brandy.

Horses	...	... 2 to 6 fluid ounces.
Cattle	...	... 5 to 10 fluid ounces.
Sheep	...	... 1 to 1½ fluid ounces.
Pigs	...	... ½ to 1 fluid ounce.

SPIRITUS TENUIOR.

Proof Spirit.

Mode of Preparation.—Mix together 5 pints of rectified spirit and 3 pints of distilled water.

Test.—The specific gravity is 0·92. Proof spirit contains

about 49 per cent. by weight, and 57 per cent. by volume, of absolute alcohol.

Preparation.—Many of the tinctures are made with proof spirit.

STAPHISAGRIÆ SEMINA.

Stavesacre Seeds.

Natural Order.—Ranunculaceæ.

Characters.—The dried ripe seeds of Delphinium Staphisagria, which grows in the south of Europe, are irregularly triangular or obscurely quadrangular, arched, blackish-brown when fresh, but dull greyish-brown after being kept. The testa is wrinkled and deeply pitted. The nucleus is soft, whitish, and oily. There is no marked odour, but the taste is nauseously bitter and acrid. The seeds contain several alkaloids, of which Delphinine and Staphisagrine are the most important, and also resin, fatty matter, wax, lignin, etc.

Preparation.—Unguentum Staphisagriæ.

Therapeutics.—Stavesacre seeds are not given internally, but externally in the form of infusion, tincture, or ointment; they are frequently applied to destroy pediculi and acari. An infusion made by boiling half an ounce of seeds in a pint of water is often used for pediculi. An ointment for lice may be made of 2 drachms of powdered stavesacre seeds to 1 ounce of lard. Digest for an hour and strain.

Another formula for stavesacre ointment, from Mr. J. B. Gresswell's *Veterinary Pharmacology*, is the following: oil of stavesacre, 1 drachm; white precipitate of mercury, 15 grains; lard, ½ ounce; vaseline, ½ ounce. For the destruction of acari it is best to combine equal parts of ointment of sulphur and ointment of stavesacre. The ointment of stavesacre alone does not act so efficiently.

STRYCHNINA.

Strychnine.

Formula.—$C_{21}H_{22}N_2O_2$.

Characters.—This very active poison, of which the dose for a man is $\frac{1}{30}$ to $\frac{1}{12}$ grain, is an alkaloid obtained from Nux Vomica. It exists in right square octahedra or prisms. The alkaloid is colourless and inodorous. It is sparingly soluble in water, but sufficiently so to impart to it an intensely bitter taste. It is soluble in boiling rectified spirit, and in chloroform, but not in absolute alcohol or in ether.

Tests.—Pure sulphuric acid forms with strychnine a colourless solution, which on the addition of bichromate of potassium acquires an intensely violet hue, which speedily passes through red to yellow. Strychnine is not coloured by nitric acid. It leaves no ash when burned with free access of air.

Preparation.—Liquor Strychninæ Hydrochloratis, which contains 1 grain in 100 fluid grains.

Therapeutics, Action, and Uses.—See Nux Vomica.

Posology:—

Horses	...	... 1 to 2 grains.
Cattle ...	...	... 1 to 3 grains.
Sheep ...	...	... $\frac{1}{4}$ to 1 grain.
Dogs ...	...	... $\frac{1}{30}$ to $\frac{1}{20}$ grain.

SUCCUS BELLADONNÆ.

Juice of Belladonna.

Mode of Preparation.—Bruise 7 pounds of the fresh leaves and young branches of the plant Atropa Belladonna in a stone mortar, press out the juice, and to every three fluid parts of juice add one of rectified spirit. Set the

mixture aside for seven days, and filter. Keep the juice in a cool place.

Posology :—

Horses and cattle	... 1 fluid ounce.
Dogs	... 10 to 20 minims.

SUCCUS CONII.

Juice of Hemlock.

Mode of Preparation.—Bruise 7 pounds of the fresh leaves and young branches of the plant Conium maculatum in a stone mortar, press out the juice, and to every three fluid parts of the juice add one of rectified spirit. Set the mixture aside for seven days, and filter. Preserve it in a cool place.

Posology :—

Horses and cattle	... 2 to 4 fluid ounces.
Sheep and pigs	... ½ to 1 fluid ounce.
Dogs ...	... 30 to 60 minims.

SUCCUS HYOSCYAMI.

Juice of Henbane.

Mode of Preparation.—Bruise 7 pounds of the fresh leaves, flowering tops and young branches of the plant Hyoscyamus niger in a stone mortar, and press out the juice. To every 3 fluid parts of the juice add 1 fluid part of rectified spirit. Set the mixture aside for seven days and filter. Preserve the preparation in a cool place.

Posology :—

Horses and cattle	... 1 to 2 fluid ounces.
Sheep and pigs	... 1 to 2 fluid drachms.
Dogs ...	... ½ to 1 drachm.

SULPHUR PRÆCIPITATUM.

Precipitated Sulphur.

Mode of Preparation.—Mix well 5 ounces of sublimed sulphur and 3 ounces of lime, place the mixture in a pint of distilled water, and heat, stirring diligently with a wooden spatula. Boil for 15 minutes, and filter. Boil the residue again in half a pint of distilled water, and filter. Add together the two filtrates, let the mixture of them cool, dilute with 2 pints of distilled water, and in an open place or under a chimney add in successive quantities 8 fluid ounces of hydrochloric acid previously mixed with a pint of distilled water, until effervescence ceases, and the mixture acquires a slightly acid reaction. Allow the precipitate to settle, decant the supernatant liquid, pour in fresh distilled water, and continue the purification by affusion of distilled water, and subsidence, until the fluid has not an acid reaction and is not precipitated with oxalate of ammonium. Collect the sulphur which is precipitated on a calico filter, wash it once with distilled water, and dry it at a temperature not exceeding 48·9° C.

Characters. — Precipitated sulphur is a greyish-yellow soft powder free from grittiness and from the smell of sulphuretted hydrogen.

Tests.—When it is heated in an open vessel, precipitated sulphur burns with a blue flame and the evolution of sulphurous oxide gas. It is entirely volatilized by heat. By the aid of a microscope it is seen to consist of opaque globules without any admixture of crystalline matter. In other points it resembles sublimed sulphur.

Therapeutics.—Precipitated sulphur is more finely divided

than sublimed sulphur, and thus is more active as an aperient. The therapeutic action and posology are the same as those of sublimed sulphur.

SULPHUR SUBLIMATUM.

Sublimed Sulphur.

Mode of Preparation.—Sublimed sulphur is prepared from crude or rough sulphur by sublimation.

Characters.—Sublimed sulphur is a slightly gritty powder of a fine greenish-yellow colour. It is tasteless and odourless except when heated. In open vessels it burns with a blue flame, and gives off sulphurous acid gas; and it is entirely volatilized by heat. Sublimed sulphur does not redden moistened blue litmus. Solution of ammonia agitated with it and filtered does not on evaporation leave any residue.

Preparations :—

Unguentum Sulphuris (1 part in 5).
Antimonii Sulphidum et Oxidum.
Potassii Sulphidum et Sulphas.
Sulphuris Iodidum.
Sulphur Sublimatum.

Therapeutics.—Externally, sulphur is a vascular stimulant and alterative. It is also destructive to acari and lice, especially the former. In mange and phtheiriasis, it is best to have the animal's skin thoroughly washed with soft soap and warm water, and then, after drying the patient, to apply ointment for the destruction of the parasites. For mange, equal parts of ointment of sulphur and ointment of stavesacre is a useful application, or an ointment may be made of 2 parts of sulphur, 1 part of carbonate of potassium, and 10 parts of lard. The ointment of iodide of

sulphur is also a very valuable application (see Sulphuris Iodidum). Sulphur ointment is used in cases of eczema and psoriasis as a vascular stimulant and alterative. Internally, sulphur is laxative, alterative, and expectorant, and possesses mild cutaneous, stimulant, and diaphoretic properties. It is given in cases of piles and in pregnancy for sheep, pigs, and dogs. It is best given with treacle.

Posology:—

Laxative.

Horses ...	... 3 to 4 ounces.
Cattle ...	... 4 to 6 ounces.
Sheep ...	... 1½ to 2 ounces.
Pigs ...	... 1 to 1½ ounces.
Dogs ...	... 4 to 6 drachms.

Alterative.

Horses ...	... 1 to 2 ounces.
Cattle ...	... 1 to 3 ounces.
Sheep ...	... 4 to 8 drachms.
Pigs ...	... 4 to 6 drachms.
Dogs ...	... ½ to 2 drachms.

SULPHURIS IODIDUM.

Iodide of Sulphur.

Mode of Preparation. — Rub together in a glass or earthenware mortar 4 ounces of iodine and 1 ounce of sublimed sulphur, until they are thoroughly mixed. Place the mixture in a flask, close the orifice loosely, and heat gently. When the colour of the mass is uniformly dark throughout, increase the heat so as to produce liquefaction. Incline the flask in different directions, in order to return into the liquid any portion of the iodine which may have

been condensed on the inner surface of the vessel. Remove the flask from the source of heat, and when the liquid has congealed, remove the mass by breaking the flask. Break up the mass, and keep the pieces in a well-stoppered bottle.

Characters and Tests.—Iodide of sulphur is a greyish-black solid substance, with a radiated crystalline appearance. It resembles iodine in smell, and in the power of staining the skin when applied to it. It is soluble in about 60 parts of glycerine, and insoluble in cold water. If 100 grains be thoroughly boiled with water, the iodine will pass off in vapour, and about 20 grains of sulphur will remain.

Preparation.—Unguentum Sulphuris Iodidi.

Therapeutics.—Iodide of sulphur externally applied is a vascular stimulant and nervous sedative, having alterative properties also. It is destructive to skin parasites of animal and vegetable nature. It is used in the form of ointment (1 part to 10 of lard) for mange and ringworm, and also for eczema and in irritating skin diseases.

SYRUPUS.

Syrup.

Mode of Preparation.—Dissolve 5 pounds of refined sugar in 2 pints of distilled water with the aid of heat; and add, after cooling, as much distilled water as may be necessary to make the weight of the product $7\frac{1}{2}$ pounds. The specific gravity should be 1·33.

Preparation.—Syrupus Chloralis Hydratis.

SYRUPUS CHLORALIS HYDRATIS.

Syrup of Hydrate of Chloral.

Mode of Preparation.—Dissolve 80 grains of hydrate of chloral in 1½ fluid drachm of distilled water, and add simple syrup, until the mixed product measures 1 fluid ounce. The specific gravity should be about 1·32.

Composition.—One fluid drachm of syrup of chloral contains 10 grains of hydrate of chloral.

Posology :—

Dogs ... ... ½ to 2 fluid drachms.

SYRUPUS FERRI IODIDI.

Syrup of Iodide of Iron.

Mode of Preparation.—Dissolve with the aid of heat 28 ounces of refined sugar in 10 fluid ounces of distilled water. Digest 2 ounces of iodine and 1 ounce of iron with 3 fluid ounces of water in a flask, heating gently, and occasionally shaking until the froth becomes white. Add 2 fluid ounces of the syrup as above prepared, and boil gently for ten minutes. Filter the liquid, while it is still hot, into the remainder of the warm syrup, and mix. The product should weigh about 2 pounds and 11 ounces ; and its specific gravity should be about 1·385.

Composition.—Syrup of iodide of iron contains about 4·3 grains of iodide of iron in 1 fluid drachm.

Therapeutics.—The syrup of iodide of iron is a convenient form for administering iodide of iron to dogs.

Posology :—

Dogs ... ... ½ to 1 drachm.

SYRUPUS FERRI PHOSPHATIS.

Syrup of Phosphate of Iron.

Composition.—Syrup of phosphate of iron contains the equivalent of anhydrous phosphate of iron, $Fe_3(PO_4)_2$, in 1 fluid drachm.

Therapeutics.—Syrup of phosphate of iron is given to dogs in rickets, and in recovering from distemper and other debilitating diseases.

Posology :—

Dogs ... ... $\frac{1}{2}$ to 1 fluid drachm.

TABACI FOLIA.

Tobacco Leaves.

Natural Order.—Solanaceæ.

Characters.—The dried leaves of Nicotiana Tabacum* are large, being sometimes more than 20 inches long; ovate, ovate-lanceolate, or oval-oblong, acute, entire, brown, brittle, glandular-hairy. They have a characteristic odour and a nauseously-bitter acrid taste; and yield, when distilled with solution of hydrate of potassium, an alkaline fluid, which has the peculiar odour of nicotine, and precipitates with perchloride of platinum and tincture of galls.

Therapeutics.—The action of tobacco is the same as that of nicotine, but not so powerful. It stimulates, and then paralyzes the motor nerves of the involuntary muscles and the secreting nerves of glands. It especially acts upon the nervous system, which it first stimulates, but afterwards depresses, causing extreme debility and depression. The spinal cord is at first stimulated, convulsions being caused, and afterwards it is paralyzed. Respiration is first excited, then perturbed, and finally arrested, death from poisoning by tobacco being due to cessation of the activity of the

* Virginia Tobacco, cultivated in America. As a rule, ordinary 'shag' is used.

respiratory centre. On the circulation, tobacco causes a great diminution of pulse-rate and a fall of blood-pressure, followed by a rise of blood-pressure, the pulse still remaining slow ; but if a large dose be given, the pulse-rate rises very quickly (Brunton). On the alimentary canal, tobacco acts as a gastro-intestinal irritant, and markedly increases peristalsis.

Externally, tobacco is destructive to acari in horses, sheep, and dogs, and weak solutions in water are used for this purpose. Care should be taken not to have them too strong, as the toxic properties of the drug may be brought out by absorption through the skin. Internally, tobacco has been given to horses with tetanus, more especially in cases of the acute traumatic variety, and the results are most satisfactory.* It is usually given in one drachm and a half doses three times daily in the form of powder, or the alkaloid nicotine may be given hypodermically. Tobacco has also anthelmintic properties, and it may be given internally, or in the form of the enema, to dislodge ascarides from the rectum. In protracted constipation from lead poisoning, it is also very useful, as also in impaction of the colon.

Posology :—

Tobacco.

Horses and cattle	... 1 to 1½ drachms.
Sheep ...	... 10 to 15 grains.
Dogs ...	... 3 to 6 grains.

Nicotine.

Horses ...	... 1 to 4 grains.

TEREBINTHINA CANADENSIS.

Canada Turpentine.

Synonym.—Canada Balsam.

Natural Order.—Coniferæ.

* Tobacco combined with bromide of potassium we have found of great value in the treatment of tetanus in horses.

Mode of Preparation.—Canada turpentine is obtained by puncturing or incising the bark of the trunk and branches of Pinus balsamea.

Characters.—Canada turpentine is a pale yellow and faintly green transparent oleo-resin, of the consistence of thin honey, possessing a peculiar agreeable odour, and a slightly bitter and feebly acrid taste. On exposure to the air, it dries very slowly, forming a transparent adhesive varnish. When mixed with about a sixth of its weight of oxide of magnesium, Canada turpentine solidifies.

Preparation.—Collodium Flexile.

THERIACA.

Treacle.

Characters.—Treacle, the uncrystallized residue left after the refining of sugar, is a thick fermentable syrup of a golden colour, and very sweet taste. It does not crystallize by spontaneous evaporation. The specific gravity is about 1·4. Treacle should be free from empyreumatic odour or flavour.

Therapeutics.—Treacle is given as a laxative and adjunct to purgatives. For cattle and sheep it is employed after the administration of active purgatives to promote their action. It is largely used in making masses and gargles.

Posology :—

Horses and cattle	... 20 ounces.
Sheep ...	... 4 ounces.
Pigs ...	... 2 to 3 ounces.
Dogs ...	... 1 ounce.

TINCTURA ACONITI.

Tincture of Aconite.

Mode of Preparation.—Macerate, with occasional agitation in a closed vessel, 2½ ounces in No. 40 powder of the root

of the plant Aconitum Napellus, cultivated in Britain, for 48 hours in 15 fluid ounces of rectified spirit. Transfer to a percolator, and, when the fluid ceases to pass, add 5 ounces of rectified spirit. Subject the contents of the percolator to pressure, and filter the product. Mix the filtrates, and add sufficient rectified spirit to make 1 pint.

N.B.—Fleming's tincture of aconite is nearly four times as strong as the above B. P. tincture.

Posology :—

Horses	...	... 30 to 50 minims.
Cattle	...	... 40 to 60 minims.
Sheep	...	... 8 to 10 minims.
Pigs	...	... 8 to 10 minims.
Dogs	...	... 3 to 6 minims.

TINCTURA ARNICÆ.

Tincture of Arnica.

Mode of Preparation.—Macerate, in a closed vessel with occasional agitation, 1 ounce of the rhizome of Arnica montana, in No. 40 powder, for 48 hours in 15 fluid ounces of rectified spirit. Transfer to a percolator, and when the fluid ceases to pass, add 5 ounces more of rectified spirit. Then subject the contents of the percolator to pressure, and filter the product. Mix the filtrates, and add sufficient rectified spirit to make 1 pint in all.

Therapeutics.—See Arnicæ Rhizoma.

TINCTURA BELLADONNÆ.

Tincture of Belladonna.

Mode of Preparation.—Tincture of belladonna is made with 1 ounce of belladonna leaves, in No. 20 powder, and a sufficient quantity of proof spirit, the operations being the same as those described for making the tinctures of aconite

and arnica. One ounce of belladonna leaves is used to make 1 pint of the tincture.

Posology :—

Horses and cattle	... 1 fluid ounce.
Dogs ...	... 10 to 20 minims.

TINCTURA CAMPHORÆ COMPOSITA.

Compound Tincture of Camphor.

Mode of Preparation.—Take of

Powdered Opium, 40 grains;
Benzoic Acid, 40 grains;
Camphor, 30 grains;
Oil of Anise, $\frac{1}{2}$ fluid drachm;
Proof Spirit, 1 pint.

Macerate the above for seven days in a closed vessel, occasionally shaking the mixture. Filter, and add to the filtrate sufficient proof spirit to make it measure 1 pint.

Composition.—Compound tincture of camphor contains the soluble matter of a quarter of a grain of opium in 1 fluid drachm.

Posology :—

Dogs	... 20 to 60 minims.

TINCTURA CANNABIS INDICÆ.

Tincture of Indian Hemp.

Mode of Preparation.—Dissolve 1 ounce of Extract of Indian Hemp in 1 pint of rectified spirit.

Posology :—

Horses ...	... 1 to 2 fluid ounces.
Cattle ...	... 2 fluid ounces.
Dogs ...	... 15 to 30 minims.

TINCTURA CANTHARIDUM.

Tincture of Cantharides.

Mode of Preparation.—Macerate for seven days in a closed vessel, occasionally shaking ¼ ounce of coarsely powdered cantharides and 1 pint of proof spirit. Strain, press, filter, and add sufficient proof spirit to make up the filtrate to 1 pint.

Posology :—

Horses ...	... ½ to 1 fluid ounce.
Cattle ...	... 1 fluid ounce.
Sheep and pigs	... 1 to 2 fluid drachms.
Dogs ...	... 20 to 30 minims.

TINCTURA CAPSICI.

Tincture of Capsicum.

Mode of Preparation.—Tincture of Capsicum is made from ¾ ounce of the fruit of Capsicum fastigiatum and a sufficiency of rectified spirit, in the same way as that described in the making of the tinctures of aconite, arnica, and belladonna.

Three-quarters of an ounce of capsicum fruit is used to make 1 pint of the tincture.

Posology :—

Horses ...	... 2 to 4 fluid drachms.
Cattle ...	... 1 fluid ounce.
Sheep ...	... 1 to 4 fluid drachms.
Pigs ...	... 1 to 2 fluid drachms.
Dogs ...	... 10 to 40 minims.

TINCTURA CARDAMOMI COMPOSITA.

Compound Tincture of Cardamoms.

Mode of Preparation.—Take of

Bruised Cardamom Seeds, ¼ ounce;
Bruised Caraway Fruit, ¼ ounce;
Raisins, freed from seeds, 2 ounces;
Bruised Cinnamon Bark, ½ ounce;
Powdered Cochineal, 55 grains;
Proof Spirit, a sufficiency.

Macerate in a closed vessel the solid constituents for forty-eight hours in 15 fluid ounces of proof spirit, with occasional agitation. Transfer to a percolator, and when the fluid ceases to pass, add 5 fluid ounces of proof spirit. Subject the contents of the percolator to pressure, and filter the liquid product. Mix the two filtrates, and add sufficient proof spirit to make 1 pint of the compound tincture.

Posology:—

Horses	...	... 2 to 4 fluid ounces.
Sheep	...	... 1 fluid ounce.
Pigs	...	... ½ fluid ounce.
Dogs	...	... 1 to 3 fluid drachms.

TINCTURA CINCHONÆ.

Tincture of Cinchona.

Mode of Preparation.—Tincture of Cinchona is made as described in the cases of the tinctures of aconite, arnica, belladonna, capsicum, and compound tincture of camphor, the ingredients used being 4 ounces of red cinchona bark in No. 40 powder, and a sufficiency of proof spirit.

Four ounces of red cinchona bark are used to make 1 pint.

Posology:—

Horses	...	... 1 to 2 fluid ounces.
Cattle	...	... 2 to 4 fluid ounces.
Sheep	..	... ½ to 1 fluid ounce.
Pigs	...	... 2 to 4 fluid drachms.
Dogs	...	... 1 to 2 fluid drachms.

TINCTURA COLCHICI SEMINUM.

Tincture of Colchicum Seeds.

Mode of Preparation.—Treat 2½ ounces of finely comminuted colchicum seeds with a sufficiency of proof spirit, as described in the preparation of compound tincture of camphor, to make 1 pint of the tincture.

Posology:—

Horses and cattle		... ½ to 1½ fluid ounces.
Sheep and pigs		... 1 to 2 fluid drachms.
Dogs	...	... 15 to 30 minims.

TINCTURA CONII.

Tincture of Hemlock.

Mode of Preparation.—Treat 2½ ounces of the finely comminuted fruit of Conium maculatum with a sufficient quantity of proof spirit to make 1 pint of the tincture, as referred to in the case of the preceding.

Posology:—

Horses	...	... 1 to 2 fluid ounces.
Cattle	...	... 1 to 2 fluid ounces.
Sheep	...	... 2 to 3 fluid drachms.
Pigs	...	... 2 to 3 fluid drachms.
Dogs	...	... 10 to 30 minims.

TINCTURA CUBEBÆ.

Tincture of Cubebs.

Mode of Preparation.—Treat 2½ ounces of powdered cubebs with a sufficient quantity of rectified spirit, in the manner above referred to, to make 1 pint of the tincture.

Posology :—

Horses	...	... 2 to 4 fluid ounces.
Cattle	...	... 2 to 4 fluid ounces.
Sheep	..	... ½ to 1 fluid ounce.
Pigs	...	... ½ to 1 fluid ounce.
Dogs	...	... ½ to 2 fluid drachms.

TINCTURA DIGITALIS.

Tincture of Digitalis.

Mode of Preparation.—As above, treat 2½ ounces of foxglove leaves, in No. 20 powder, with proof spirit to make 1 pint of the tincture.

Posology :—

Horses	...	... 2 to 4 fluid drachms.
Dogs	...	... 5 to 15 minims.

TINCTURA ERGOTÆ.

Tincture of Ergot.

Mode of Preparation.—As above, treat 5 ounces of finely comminuted ergot with proof spirit to make 1 pint of the tincture.

Posology :—

Mare	...	... ½ to 1 fluid ounce.
Cow	...	... 1 to 2 fluid ounces.
Ewe	...	... 1 to 2 fluid drachms.
Sow	...	... 1 to 2 fluid drachms.
Bitch	...	... 20 to 60 minims.

TINCTURA FERRI PERCHLORIDI.

Tincture of Perchloride of Iron.

Mode of Preparation.—Mix 5 fluid ounces of strong solution of perchloride of iron, 5 fluid ounces of rectified spirit, and 10 fluid ounces of distilled water. Shake well, and add distilled water to make 1 pint. Preserve the tincture in a stoppered bottle.

Posology :—

Horses	...	... ½ to 1 fluid ounce.
Cattle	...	... 1 to 2 fluid ounces.
Sheep	...	... 2 to 4 fluid drachms.
Pigs	...	... 2 to 4 fluid drachms.
Dogs	...	... 5 to 15 minims.

TINCTURA GENTIANÆ COMPOSITA.

Compound Tincture of Gentian.

Mode of Preparation.—Treat with proof spirit in the manner mentioned in the case of compound tincture of cardamoms, so as to make 1 pint of the compound tincture of gentian, the following solid ingredients :—

Gentian Root, cut small and bruised, 1½ ounce;
Bitter Orange-peel, cut small and bruised, ¾ ounce;
Cardamom Seeds, bruised, ¼ ounce.

Posology :—

Horses and cattle		... 2 to 4 fluid ounces.
Sheep	...	... 1 fluid ounce.
Pigs	...	... ½ fluid ounce.
Dogs	...	... 1 fluid drachm.

TINCTURA HYOSCYAMI.

Tincture of Henbane.

Mode of Preparation.—Make 1 pint of the tincture from 2½ ounces of the leaves or flowering tops of the plant Hyoscyamus niger in No. 20 powder, by means of 1 pint of proof spirit and subsequent addition of a sufficiency of proof spirit, as described above in the case of tincture of aconite, etc.

Posology :—

Horses	...	... 1 to 2 fluid ounces.
Cattle	...	... 2 to 3 fluid ounces.
Sheep	...	... 2 fluid drachms.
Pigs	...	... 2 fluid drachms.
Dogs	...	... 1 fluid drachm.

TINCTURA IODI.

Tincture of Iodine.

Mode of Preparation.—Dissolve ½ ounce of iodine and ½ ounce of iodide of potassium in 1 pint of rectified spirit.

Preparation.—Vapor Iodi.

Therapeutics.—Used externally and internally.

Posology :—

Horses	...	... 2 to 4 fluid drachms.
Cattle	...	... 3 to 6 fluid drachms.
Sheep	...	... 1 to 2 fluid drachms.
Pigs	...	... 20 to 40 minims.
Dogs	...	... 10 to 20 minims.

TINCTURA JABORANDI.

Tincture of Jaborandi.

Mode of Preparation.—Treat 5 ounces of Jaborandi in No. 40 powder with 1 pint of proof spirit, and make up the tincture to the bulk of a pint with proof spirit, as described in the case of tincture of aconite.

Posology:—

Horses	...	... 1 to 2 fluid ounces.
Cattle	...	... 1 to 2 fluid ounces.
Sheep	...	... 1 to 3 fluid drachms.
Pigs	...	... 1 to 2 fluid drachms.
Dogs	...	... ½ to 1½ fluid drachms.

TINCTURA LOBELIÆ ÆTHEREA.

Ethereal Tincture of Lobelia.

Mode of Preparation.—Macerate in a closed vessel for seven days 2½ ounces of lobelia in coarse powder in 1 pint of spirit of ether, with occasional agitation. Strain, press, filter, and add sufficient spirit of ether to make 1 pint.

Posology:—

Horses	...	... ½ to 1 fluid ounce.

TINCTURA MYRRHÆ.

Tincture of Myrrh.

Mode of Preparation. — Treat 2½ ounces of coarsely powdered myrrh with 1 pint of rectified spirit, and make up to 1 pint as above described in the case of tincture of aconite.

Therapeutics.—Used externally (see Myrrh).

TINCTURA NUCIS VOMICÆ.

Tincture of Nux Vomica.

Mode of Preparation.—Mix sufficient rectified spirit with 4 fluid ounces of distilled water to produce 20 fluid ounces, and dissolve 133 grains of extract of nux vomica in the mixture.

Composition.—One fluid ounce of this tincture contains 1 grain of the alkaloids of nux vomica.

Posology :—

Horses	...	... 3 to 6 fluid drachms.
Cattle	...	... 4 to 8 fluid drachms.
Sheep	...	... 1 to 1½ fluid drachms.
Pigs	...	... 1 to 1½ fluid drachms.
Dogs	...	... 10 to 20 minims.

TINCTURA OPII.

Tincture of Opium.

Mode of Preparation.—Macerate for seven days in a closed vessel, with occasional agitation, 1½ ounces of powdered opium in 1 pint of proof spirit. Strain, press, filter, and add sufficient proof spirit to make 1 pint of the tincture.

Composition.—One fluid ounce contains about 3·3 grains of morphine.

Preparations :—

Enema Opii.
Linimentum Opii.

Posology :—

Horses	...	... 1 to 3 fluid ounces.
Cattle	...	... 1 to 3 fluid ounces.
Sheep	...	... 2 to 6 fluid drachms.
Pigs	...	... 2 to 4 fluid drachms.
Dogs	...	... 15 to 30 minims.

TINCTURA QUININÆ.

Tincture of Quinine.

Mode of Preparation.—Dissolve 160 grains of hydrochlorate of quinine in 1 pint of tincture of orange-peel with the aid of heat. Allow the solution to remain for three days in a closed vessel, shake it occasionally, and finally filter.

Posology:—

Dogs	...	... ½ to 2 fluid drachms.

TINCTURA ZINGIBERIS FORTIS.

Strong Tincture of Ginger.

Mode of Preparation.—Pack 10 ounces of finely powdered ginger in a percolator, and pour over it half a pint of rectified spirit. At the expiration of two hours, add more spirit, and let it percolate slowly until 1 pint of tincture has been collected.

Posology:—

Horses ...	... 1 to 2 fluid ounces.
Cattle ...	... 2 to 4 fluid ounces.
Sheep ...	... 2 to 4 fluid drachms.
Pigs ...	... 1 to 2 fluid drachms.
Dogs ...	... 20 minims to 1 fluid drachm.

UNGUENTUM ACIDI BORICI.

Ointment of Boric Acid.

Mode of Preparation.—Melt 4 parts of soft paraffin and 2 parts of hard paraffin together, and add 1 part of boric acid in fine powder, distributing it over the surface of the liquid by passing it through a sieve. Then stir the mixture constantly until it is cold.

UNGUENTUM ACIDI CARBOLICI.

Ointment of Carbolic Acid.

Mode of Preparation.—Melt and stir together constantly until the ointment is cold, 1 part of carbolic acid, 12 parts of soft paraffin, and 6 parts of hard paraffin.

UNGUENTUM ACIDI CARBOLICI COMPOSITUM.

Compound Ointment of Carbolic Acid.

Mode of Preparation.—Take of

Benzoated Lard, 8 ounces;
Bees' Wax, 1½ ounces;
Olive Oil, 1½ ounces;
Carbolic Acid, 3 fluid drachms;
Oil of Eucalyptus, 6 fluid drachms;
Iodoform, 3 drachms.

Melt the lard and wax, and add the other ingredients, stirring while the ointment cools.

UNGUENTUM ACIDI SALICYLICI.

Ointment of Salicylic Acid.

Mode of Preparation.—Melt 18 parts of soft paraffin and 9 parts of hard paraffin together; add 1 part of salicylic acid, and stir the mixture constantly until it is cold.

UNGUENTUM ACONITI.

Ointment of Aconite.

Mode of Preparation.—Take of extract of aconite 2 ounces, prepared lard 4 ounces. Mix.

UNGUENTUM ACONITINÆ.

Ointment of Aconitine.

Mode of Preparation.—Dissolve 1 part of aconitine in 3½ fluid parts of rectified spirit; add 55 parts of benzoated lard, and thoroughly mix.

UNGUENTUM ATROPINÆ.

Ointment of Atropine.

Mode of Preparation.—Dissolve 1 part of atropine in 3½ fluid parts of rectified spirit; add 55 parts of benzoated lard, and mix thoroughly.

UNGUENTUM BELLADONNÆ.

Ointment of Belladonna.

Mode of Preparation.—Mix thoroughly 1 part of alcoholic extract of belladonna with 9 parts of benzoated lard.

UNGUENTUM CANTHARIDUM.

Ointment of Cantharides.

Synonyms.—Unguentum Lyttæ; Blistering Ointment.

Mode of Preparation.—Melt together thoroughly over a fire in a saucepan the following:—

Four pounds of Lard.
Four pounds of Resin.
Four fluid ounces of Turpentine.
Four fluid ounces of Oleum Succini.

Mix together with great care 2 fluid drachms of sulphuric acid and 2 fluid ounces of distilled water, and add the fluid mixture so formed to the above mixture. Finally add 1 pound of finely powdered cantharides, and stir thoroughly while the ointment is allowed to cool.

UNGUENTUM CHRYSAROBINI.

Ointment of Chrysarobin.

Mode of Preparation.—Melt 24 parts of benzoated lard, add 1 part of chrysarobin, and stir them together. Continue to heat the mixture for some time, and then stir until the ointment is cold.

UNGUENTUM EUCALYPTI.

Ointment of Eucalyptus.

Mode of Preparation.—Mix together 2 parts of hard paraffin and 2 parts of soft paraffin, and melt the mixture. Add 1 part by weight of oil of eucalyptus, and stir until the ointment is cold.

UNGUENTUM HYDRARGYRI.

Ointment of Mercury.

Mode of Preparation.—Rub together 16 parts of mercury, 16 parts of prepared lard, and 1 part of prepared suet, until metallic globules are no longer visible.

Preparation.—Linimentum Hydrargyri.

UNGUENTUM HYDRARGYRI AMMONIATI.

Ointment of Ammoniated Mercury.

Synonym.—Ointment of White Precipitate.

Mode of Preparation.—Mix thoroughly 1 part of ammoniated mercury and 9 parts of simple ointment.

Composition.—The strength is 10 per cent.

UNGUENTUM HYDRARGYRI IODIDI RUBRI.

Ointment of Red Iodide of Mercury.

Modes of Preparation :—

(*a*) Mix thoroughly 1 part of finely powdered red iodide of mercury and 9 parts of simple ointment.

(*b*) Melt with heat 8 pounds of lard. Rub with a wooden knife by degrees 1 pound of red iodide of mercury with successive portions of olive oil, using in all 1 pint of olive oil. Then add the mixture of oil and red iodide of mercury to the melted lard, and continue stirring until the ointment is cool.

UNGUENTUM HYDRARGYRI NITRATIS.

Ointment of Nitrate of Mercury.

Synonym.—Unguentum Citrinum.

Take of

Mercury by weight, 4 ounces;
Nitric Acid, 12 fluid ounces;
Prepared Lard, 15 ounces;
Olive Oil, 32 fluid ounces.

Mode of Preparation.—Dissolve the mercury in the nitric acid with the aid of a gentle heat. Melt the lard in the oil by a steam- or water-bath, in a porcelain vessel capable of holding six times the quantity, and while the mixture is at about 100° C. add the solution of mercury also at about the same temperature, mixing them thoroughly. If the mixture does not froth up, increase the heat until this does happen. Keep stirring until the mixture is cold.

Preparation.—Unguentum Hydrargyri Nitratis Mite.

UNGUENTUM HYDRARGYRI NITRATIS MITE.

Diluted Ointment of Nitrate of Mercury.

Mode of Preparation.—Mix together :—

Nitrate of Mercury Ointment, 1 part;
Soft Paraffin, 2 parts.

UNGUENTUM IODI COMPOSITUM.

Compound Ointment of Iodine.

Take of

Iodine, 4 drachms ;
Iodide of Potassium, 4 drachms ;
Glycerine, 2 fluid drachms ;
Prepared Lard, 10 ounces.

Mode of Preparation.—Rub the iodine and the iodide of potassium together with the glycerine in a porcelain or glass mortar ; add the lard gradually, and mix.

UNGUENTUM PLUMBI ACETATIS COMPOSITUM.

Compound Ointment of Acetate of Lead.

Synonym.—Milk Absorbent Ointment.

Mode of Preparation.—Take of

Carbonate of Lead, $2\frac{1}{2}$ pounds ;
Acetate of Lead in fine powder, 10 ounces ;
Alum, 10 ounces ;
Lard, $7\frac{1}{2}$ pounds ;
Rose Pink, 3 ounces.

Mix thoroughly.

UNGUENTUM POTASSII SULPHIDI ET POTASSII SULPHATIS.

Ointment of Sulphate and Sulphide of Potassium.

Mode of Preparation.—Take of

Sulphurated Potash, 5 parts ;
Hard Paraffin, 18 parts ;
Soft Paraffin, 55 parts.

Triturate the sulphurated potash in a glass or porcelain mortar, and gradually add the previously melted mixture of the hard and soft paraffins. Rub together until the ointment is free from grittiness. This ointment should be recently prepared.

UNGUENTUM SIMPLEX.

Simple Ointment.

Mode of Preparation.—Melt 1 part of white wax and $1\frac{1}{2}$ part of benzoated lard in $1\frac{1}{2}$ fluid part of almond oil in a water-bath. Remove and stir the mixture constantly while it cools.

Preparations :—

Unguentum Hydrargyri Ammoniati.
Unguentum Hydrargyri Iodidi Rubri.

UNGUENTUM STAPHISAGRIÆ.

Ointment of Stavesacre.

Mode of Preparation.—Crush 1 part of stavesacre seeds, and macerate them in 2 parts of benzoated lard kept melted over a water-bath for two hours. Strain through calico, and cool.

Composition.—Ointment of stavesacre contains about 10 per cent. of oil of stavesacre.

UNGUENTUM SULPHURIS.

Ointment of Sulphur.

Mode of Preparation.—Mix thoroughly 1 part of sublimed sulphur with 4 parts of benzoated lard.

UNGUENTUM SULPHURIS IODIDI.

Ointment of Iodide of Sulphur.

Mode of Preparation.—Triturate 5 parts of iodide of sulphur in a porcelain mortar, and add gradually the previously melted mixture of 18 parts of hard paraffin and 55 parts of soft paraffin. Rub together until the ointment is cold and free from grittiness.

UNGUENTUM TEREBINTHINÆ.

Ointment of Turpentine.

Synonym.—Digestive Ointment.

Mode of Preparation.—Take of

Oil of Turpentine, 1 fluid part;
Resin, in powder, 1 part;
Yellow Wax, $\frac{1}{20}$ part;
Prepared Lard, 3 parts.

Melt the ingredients by the heat of a steam, or water-bath. Remove the vessel, and stir the mixture constantly while it cools.

UNGUENTUM ZINCI OXIDI.

Ointment of Oxide of Zinc.

Mode of Preparation.—Add 1 part of oxide of zinc to 5 parts of benzoated lard, previously melted at a low temperature, and stir the mixture constantly while it cools.

VALERIANÆ RHIZOMA.

Valerian Rhizome.

Synonym.—Valerianæ Radix.

Natural Order.—Valerianaceæ.

Characters.—The rhizome and rootlets of Valeriana officinalis should be collected in autumn from plants growing wild or cultivated in Britain, and dried. The rhizome is short and erect, entire or sliced, and dark yellowish-brown externally. It gives off numerous slender, brittle, and shrivelled rootlets, three or four inches in length. The rootlets are whitish internally, and in this as in their external colour are like the rhizome. The odour which is developed in drying is strong and peculiar. The taste is unpleasant, camphoraceous, and slightly bitter. When valerian rhizome is distilled with water, volatile oil and valerianic acid are produced.

Therapeutics.—Valerian is a powerful carminative, circulatory stimulant, excitant of the cerebro-spinal system, and antispasmodic. It has also anthelmintic properties. It is but little used in veterinary medicine, but is sometimes prescribed for chorea and epilepsy in dogs. On horses and cattle its effect is very slight. It may be administered in powder or as infusion, or may be dissolved in spirit of ammonia.

Posology :—

Horses and cattle	... 1 to 2 ounces.
Dogs ...	... 1 to 2 drachms.
Cats ...	... ½ drachm.

VAPOR CREASOTI.

Inhalation of Creasote.

Mode of Preparation.—Mix 1 fluid drachm of creasote with 10 fluid ounces of boiling water for inhalation.

VERATRI VIRIDIS RHIZOMA.

Green Hellebore Rhizome.

Synonym.—Veratri Viridis Radix.

Natural Order.—Melanthaceæ.

Characters.—The dried rhizome of Veratrum viride is entire, or transversely or longitudinally divided, and may or may not have attached rootlets. When entire, the rhizome is from one to two inches or more in length, and three-quarters of an inch or more in diameter, erect, obconical, obtuse or truncated at the apex, dark brown externally, whitish within. The rhizome frequently bears at its upper end the concentrically arranged remains of leaves, and gives off on all sides numerous shrivelled yellowish-white rootlets several inches in length. The rootlets may have been broken off and the rhizome marked with corresponding scars. The rhizome and rootlets are odourless, but when powdered excite sneezing. The taste is bitterish and very acrid.

Therapeutics.—Externally, green hellebore and its alkaloid veratrine act firstly as powerful irritants, and then as depressants, to the nerves and vessels, owing to the fact that when used for local purposes, they are liable to be absorbed and produce constitutional effects. For the destruction of pediculi, more safe preparations are to be recommended.

Internally, green hellebore and veratrine are powerful

vaso-motor depressants. The heart's action, after primary acceleration, becomes reduced in frequency. If large doses be taken, the action becomes irregular, feeble, and accelerated, and finally paralysis of the cardiac muscle ensues. The blood-pressure rises at first under the influence of these agents, it then falls, and becomes much lowered. The action of the heart is to be attributed to the action of the drugs through the centres in the medulla. The respiration is first accelerated and finally arrested, when large doses are taken. There is a fall of temperature in fever when these agents are administered, and this is to be assigned to cardiac and circulatory depression. On the digestive tract, these agents act as irritants. The chief action, however, of veratrine is on the muscles, the periods of the contractions of which are greatly lengthened, and the strength of which is increased. If large doses are taken, the muscles are much weakened, and finally paralyzed. Toxic doses of hellebore cause spasm of the muscles, followed by paralysis, paralysis of the heart, great prostration, muscular weakness, difficulty of movement, slavering at the mouth, purging, retching, and vomiting. Finally death results from asphyxia.

Hellebore is seldom given internally, though in former times it was administered in a great many diseases of horses and cattle. For most of these purposes, aconite is, however, much to be preferred. In acute rheumatism, it is still sometimes prescribed as an antipyretic and depressant in horses, but is not so safe or reliable as salicylate of sodium.

Posology :—

Horses ...	... ½ drachm.
Cattle ...	... ½ to 1 drachm.
Sheep and pigs	... 15 to 20 grains.
Dogs ...	... 2 to 3 grains.

VERATRINA.

Veratrine.

Synonym.—Veratria.

Characters.—The active poison, veratrine, an alkaloid or mixture of alkaloids obtained from Cevadilla, is pale grey in colour and amorphous. Though inodorous, it strongly irritates the nostrils, even in the most minute quantity. It is strongly and persistently bitter, and highly acrid; insoluble in water, but soluble in spirit, in ether, and in diluted acids, leaving traces of an insoluble brown resinoid matter. A solution of veratrine in nitric acid is yellow, and a solution in sulphuric acid is deep red and exhibits a green fluorescence by reflected light. If warmed with hydrochloric acid veratrine dissolves likewise, forming a blood-red solution. If heated with access of air it melts, forming a yellow liquid, and at length burns away, leaving no residue.

Therapeutics.—Veratrine is used for making ointment for the relief of neuralgia. The British Pharmacopœial ointment of veratrine is made of 8 grains of this alkaloid, $\frac{1}{4}$ ounce of hard paraffin, $\frac{3}{4}$ ounce of soft paraffin, and 1 fluid drachm of olive oil.

VINUM IPECACUANHÆ.

Wine of Ipecacuanha.

Mode of Preparation.—Macerate 1 ounce of coarsely powdered ipecacuanha in 1 fluid ounce of acetic acid for twenty-four hours. Transfer to a percolator, and pass sufficient distilled water through to produce 1 pint of liquor. Evaporate the product to dryness over a water-

bath. Powder the residue, macerate it in 1 pint of sherry for forty-eight hours, occasionally agitating, and filter.

Posology:—

Dogs { 1 to 2 fluid drachms, as an expectorant.
2 to 6 fluid drachms, as an emetic.

ZINCI ACETAS.

Acetate of Zinc.

Formula.—$Zn(C_2H_3O_2)_2,2H_2O$.

Add 2 ounces of carbonate of zinc in successive portions to a mixture of 3 fluid ounces of acetic acid and 6 fluid ounces of distilled water in a flask. Heat gently, and add by degrees 2 fluid ounces or a sufficiency of acetic acid until the carbonate of zinc is dissolved. Boil for a few minutes, filter while the solution is hot, and set the filtrate aside for two days in order that the acetate may crystallize. Decant the mother liquor, evaporate it to half its bulk, and likewise set it aside for two days to crystallize. Place the crystals in a funnel to drain, then spread them on filter-paper on a porous tile, and dry them by exposure to the air at the ordinary temperature.

Characters.—Acetate of zinc exists in thin translucent and colourless crystalline plates, having a pearly lustre. The salt possesses a sharp unpleasant taste.

Tests.—When decomposed by sulphuric acid, sulphate of zinc is produced, while acetic acid is evolved. The salt is soluble in water, and the aqueous solution gives a white precipitate with sulphuretted hydrogen. A diluted aqueous solution does not give precipitates with chloride of barium nor with nitrate of silver. When slightly acidulated with hydrochloric acid, it is not precipitated by sulphuretted hydrogen. After it has been boiled for a few minutes with a little nitric acid, the aqueous solution yields with ammonia a white

precipitate, which is entirely soluble without colour in an excess of the ammonia.

Therapeutics.—Acetate of zinc in its action is very similar to the sulphate, having emetic and nervine tonic properties; but it is rarely or never prescribed for internal purposes. Externally it is used for the same purposes as the sulphate, though not nearly so frequently employed. As an injection for gonorrhœa it seems to be preferable to the sulphate, and may be used in the strength of 5 to 6 grains to the ounce of water.

ZINCI CARBONAS.

Carbonate of Zinc.

Formula.—$ZnCO_3(Zn2HO)_2,H_2O$.

Composition.—A mixture of zinc carbonate and zinc hydrate.

Mode of Preparation.—Dissolve 10½ ounces of carbonate of sodium in a pint of boiling distilled water in a large porcelain vessel, and pass into it a solution of 10 ounces of sulphate of zinc in a pint of boiling distilled water, stirring diligently. Boil for fifteen minutes after effervescence has ceased, and allow the precipitate to subside. Decant the supernatant liquid; pour on the precipitate 3 pints of boiling distilled water, agitating briskly. Let the precipitate again subside, and repeat the processes of affusion of hot distilled water and subsidence, until the washings are no longer precipitated by chloride of barium. Collect the precipitate on calico, let it drain, and dry it at a moderate temperature.

Characters.—Carbonate of zinc is white, tasteless, and inodorous. It is insoluble in water, but soluble with effervescence and without residue in diluted nitric acid.

Tests.—A solution in nitric acid is really one of nitrate of zinc, and contains no sulphate or chloride. With car-

bonate of ammonium it yields a white precipitate soluble in excess and forming a solution which gives a white precipitate with sulphydrate of ammonium.

Preparations :—

Zinci Acetas.
Zinci Chloridum.
Zinci Oxidum.
Zinci Sulphas.

Therapeutics.—In veterinary medicine calamine (native carbonate of zinc) is generally used after partial purifying by levigation, instead of the carbonate as above prepared. It is equally serviceable, and is used externally for the same purposes as the oxide.

ZINCI CHLORIDUM.

Chloride of Zinc.

Formula.—$ZnCl_2$.

Synonym.—Butter of Zinc.

Mode of Preparation.—Place 16 ounces of granulated zinc in a porcelain basin, add by degrees 44 fluid ounces of hydrochloric acid mixed with 1 pint of distilled water, and aid the action by gently warming on a sand-bath, until the gas hydrogen is no longer evolved. Boil for half an hour, supplying the water lost by evaporation, and allow it to stand on a cool part of a sand-bath for twenty-four hours, stirring frequently. It is then necessary to test a few drops of the resulting liquid for iron or lead by adding excess of ammonia and then sulphydrate of ammonium, when a black precipitate will be produced, if iron or lead be present. Should this be the case, filter the remainder of the product into a gallon bottle and pour in solution of chlorine by degrees with frequent agitation, until the fluid obtains a permanent odour of chlorine. Add ½ ounce or a sufficient

quantity of carbonate of zinc in small quantities at a time, and with agitation until a brown sediment appears, and the iron or lead is thus precipitated. Filter through paper into a porcelain basin, and evaporate until a portion of the liquid, cooled on the end of a glass rod, forms an opaque white solid. Pour it out now into suitable moulds, and, when the salt has solidified, but before it has cooled, place it in closely stoppered bottles. The reaction of zinc on hydrochloric acid is thus expressed:—

$$Zn + 2HCl = ZnCl_2 + H_2.$$

If no iron or lead is present, filter and evaporate at once.

Characters and Tests.—Chloride of zinc exists in the form of colourless or opaque rods or tablets. It is a very deliquescent and caustic salt, almost entirely soluble in water, alcohol, or ether. The aqueous solution gives a white precipitate with ammonium sulphide and with nitrate of silver. If first acidulated with hydrochloric acid, it is not affected by sulphuretted hydrogen. The solution is not affected by chloride of barium, nor by oxalate of ammonium, and is not tinged blue by ferrocyanide, nor by ferricyanide of potassium. With ammonia the solution yields a white precipitate soluble in excess.

Preparation.—Liquor Zinci Chloridi.

Therapeutics.—Chloride of zinc is a powerful escharotic, and its application causes destruction of the tissue, with severe pain, and separation of a slough, followed by healing. In the form of a paste made with one or two parts of flour, or plaster of Paris, or in the form of concentrated solution, it is employed to destroy morbid growths, chronic ulcers, gangrenous tissues, and the walls of fistulæ and sinuses, such as those of quittor and poll evil. It is used also as a caustic for canker of the foot, protuberant granulations, foul spreading ulcers, and foot-rot in sheep. The solution of chloride of zinc (liquor zinci chloridi) is applied as an

astringent and antiseptic to wounds, and also for killing animal parasites, invading the skin, and as a wash for ticks in sheep. Chloride of zinc is very destructive to bacteria, and is used as a disinfectant. Burnett's disinfecting and deodorizing solution, which contains 25 grains to the fluid drachm, is used in the strength of 1 pint to 5 gallons of water.

ZINCI OXIDUM.

Oxide of Zinc.

Formula.—ZnO.

Mode of Preparation.—Place 6 ounces of carbonate of zinc in a loosely covered Hessian crucible, and expose it to a dull red heat, until a portion of it, taken from the centre and cooled, does not effervesce when moistened with water and dropped into diluted sulphuric acid. Then let the crucible cool, and transfer the contents to stoppered bottles. Oxide of zinc may also be obtained from metallic zinc by combustion.

Characters.—Oxide of zinc is a soft, white, or nearly white, tasteless, and inodorous powder.

Tests.—When heated, oxide of zinc becomes pale yellow in colour. It is soluble without effervescence in diluted nitric acid, and the solution thus formed is not precipitated by chloride of barium, nitrate of silver, nor by diluted sulphuric acid. With carbonate of ammonium, however, this solution yields a white precipitate which dissolves entirely and without colour in an excess of the reagent, forming a solution which gives a white precipitate with sulphydrate of ammonium.

Preparation.—Unguentum Zinci Oxidi (1 part of the oxide in 6 of the ointment).

Therapeutics.—The oxide of zinc is seldom administered internally.

Externally, being insoluble, it is employed as an astringent in the form of a powder for dusting irritable sores, or as the ointment for irritable conditions of the skin, especially eczema and erythema.

Posology :—

Horses and cattle ... ... 2 to 3 drachms.

ZINCI SULPHAS.

Sulphate of Zinc.

Formula.—$ZnSO_4,7H_2O$.

Mode of Preparation.—Mix 12 fluid ounces of sulphuric acid carefully with 4 pints of distilled water, and then pour the mixture on 16 ounces of granulated zinc contained in a porcelain vessel. When the evolution of hydrogen* has nearly ceased, aid the action by gentle heat. Test a few drops of the liquid for iron by adding excess of ammonia, and then sulphydrate of ammonium. If iron is present a black precipitate will be produced. If so, filter into a gallon bottle, and add gradually to the filtrate, while constantly shaking, solution of chlorine, until the fluid acquires a permanent odour of chlorine. Next add, still shaking constantly, $\frac{1}{2}$ ounce of carbonate of zinc or a sufficient quantity to produce a brown precipitate of the whole of the iron present. Let this precipitate subside, and filter the solution. Evaporate the filtrate until a pellicle forms on the surface, and set aside that crystals may be produced. Dry the crystals by exposure to the air on filter-paper placed on porous tiles. More crystals may be obtained in the usual way from the mother-liquor, by evaporating and allowing it to cool.

* The reaction may be thus expressed :—

$$Zn + H_2SO_4 = ZnSO_4 + H_2.$$

If the test proves the absence of iron, then filtration, evaporation, and crystallization may at once be proceeded with.

Characters.—Sulphate of zinc exists in colourless, transparent, prismatic crystals. It possesses a strong, metallic, styptic taste, and is thus easily distinguished from sulphate of magnesium, a salt which it otherwise closely resembles in general characters.

Tests.—An aqueous solution of sulphate of zinc gives white precipitates with chloride of barium and with sulphydrate of ammonium. It is not tinged purple by tincture of galls; and when acidulated with sulphuric or hydrochloric acid, it gives no precipitate with sulphuretted hydrogen. After it has been boiled for a few minutes with a little nitric acid, it yields with ammonia a white precipitate which is entirely soluble, without producing any colour, in an excess of the reagent.

Preparations :—

Zinci Carbonas.
Zinci Valerianas.

Therapeutics.—Sulphate of zinc has sedative, irritant, astringent, and antiseptic properties. It is also a nervine tonic. In dogs and pigs it produces emesis when taken in proportionately large doses, and is a useful agent to employ, when it is desired to empty the stomach rapidly. In cases of engorgement of the stomach, and in some cases of poisoning, it should be given in 2 ounces of water. On horses it has no emetic action, though it causes nausea and depression if taken in large doses. As an astringent in cases of diarrhœa, it is not so much employed as the corresponding salt of lead. In cases of chorea in dogs, it is often prescribed with benefit in the acute stages.

Externally sulphate of zinc is very frequently used for

healing ulcers and wounds, limiting the discharge, checking excessive growth, and restricting and altering the intensity of the inflammatory process with which healing is associated. The 'white lotion' is made of 6 drachms of the sulphate of zinc, 1 ounce of acetate of lead, and 2 pints of water. As an astringent lotion 5 to 15 grains to the ounce of water is the strength most suitable for wounds, sores, and ulcers. For simple ophthalmia a lotion of 1 to 2 grains to the ounce of water is very serviceable. In cases of gonorrhœa 5 grains to the ounce of water are used.

Posology :—

As an astringent and tonic.

Horses and cattle	... 1 to 2 drachms.
Sheep	... 10 to 15 grains.
Dogs	... 2 to 4 grains.

As an emetic.

Pigs	... 10 to 15 grains.
Dogs	... 6 to 12 grains.

ZINCI SULPHOCARBOLAS.

Sulphocarbolate of Zinc.

Formula.—$Zn(C_6H_5SO_4)_2,H_2O$.

Mode of Preparation.—Sulphocarbolate of zinc may be obtained by heating a mixture of carbolic acid and sulphuric acid, saturating the product with oxide of zinc, evaporating and crystallizing.

Characters.—Sulphocarbolate of zinc is composed of colourless, transparent, tabular, efflorescent crystals. It is soluble in about twice its weight of rectified spirit or of water.

Tests.—An aqueous solution is rendered violet-coloured by perchloride of iron, and affords a white precipitate with sulphydrate of ammonium. It is not at once rendered

turbid, or is only rendered faintly turbid, by chloride of barium, and is not precipitated by oxalate of ammonium.

Therapeutics.—As an astringent lotion 2 or 3 grains of sulphocarbolate of zinc to the ounce of water are very useful in cases of leucorrhœa and foul discharges from the vagina or uterus in mares and cows. In cases of gonorrhœa in bulls we have used 4 to 5 grains to the ounce with very beneficial results.

ZINCI VALERIANAS.

Valerianate of Zinc.

Formula.—$Zn(C_5H_9O_2)_2$.

Mode of Preparation.—Dissolve 5½ ounces of sulphate of zinc and 5 ounces of valerianate of sodium, each in 2 pints of distilled water. Heat both solutions to near the boiling-point, and mix them. Cool, and skim off the crystals which are produced. Evaporate the mother liquor at a temperature not exceeding 93·3° C., until it is reduced to 4 ounces. Cool, remove the crystals which have formed, and add them to those which have already been obtained. Drain the crystals on filter-paper, and wash them with a small quantity of cold distilled water until the washings give only a very feeble precipitate with chloride of barium. Again drain, and dry on filter-paper at the ordinary temperature. The salt may also be obtained by saturating valerianic acid with carbonate of zinc.

Characters.—Valerianate of zinc exists in brilliant, white, pearly, tabular crystals. The salt has an odour of valerianic acid, and gives rise to a metallic taste in the mouth. It is scarcely soluble in cold water or in ether, soluble in hot water and alcohol.

Tests.—When heated to redness in an open crucible, valerianate of zinc leaves a residue which, when dissolved in diluted sulphuric acid, yields with ammonia a white pre-

cipitate wholly soluble in excess of ammonia. The solution which results yields a white precipitate with sulphydrate of ammonium. A solution of valerianate of zinc in hot water is only faintly precipitated by chloride of barium. When heated with diluted sulphuric acid the salt yields a distillate, which, when mixed with solution of acetate of copper, does not at once affect the transparency of the fluid, but forms after a little time oily drops, which gradually pass into a bluish-white crystalline deposit.

Therapeutics.—Valerianate of zinc acts chiefly if not entirely in virtue of its zinc constituent, the valerianic acid appearing to have no action.

In acute chorea in dogs it has been prescribed by us in doses of 3 grains.

Posology :—

Dogs ... ... 2 to 4 grains.

ZINCUM.

Zinc.

Zinc of commerce.

Preparations :—

Liquor Zinci Chloridi.
Oleatum Zinci.
Unguentum Zinci Oxidi.
Zinci Acetas.
Zinci Carbonas.
Zinci Chloridum.
Zinci Oxidum.
Zinci Sulphas.
Zinci Sulphocarbolas.
Zinci Valerianas.
Zincum Granulatum.

General Action of the Preparations of Zinc.—Externally

the salts of zinc are caustic in their stronger forms, astringent or antiphlogistic in their weaker forms. The chloride is a powerful escharotic, whereas the sulphate and acetate, having less affinity for water, are much less powerful. The oxide, oleate and carbonate act as mild astringents, and being insoluble are applied in the form of powder or ointment. The preparations of zinc have powerfully disinfectant properties, and to these they owe a great share of their value as external applications.

Internally the acetate of zinc is a direct emetic in pigs and dogs, and as it causes much less immediate depression and less subsequent nausea than antimony or ipecacuanha, it is generally preferred. The other salts of zinc also have emetic properties, but the sulphate is the one generally employed.

The salts of zinc are also astringent, but are not much used in veterinary or human medicine in virtue of this property. They are direct depressants to the nervous centres, especially the sensory parts of the spinal cord, and thus they indirectly weaken and disturb the muscular system. Being eliminated by the kidneys, mammary glands, and probably by the skin and mucous surfaces, the salts of zinc exert a remote astringent effect on these organs on leaving the system.

ZINCUM GRANULATUM.

Granulated Zinc.

Mode of Preparation.—Heat 1 pound of zinc of commerce in an earthen crucible ; and, as soon as the metal is fused, remove the crucible from the fire, and, taking necessary care, pour the fluid zinc in a thin stream into a vessel containing about 2 gallons of cold water. Drain off the water, and dry the granulated zinc.

Preparations :—

Liquor Zinci Chloridi.
Zinci Chloridum.
Zinci Sulphas.

ZINGIBER.

Ginger.

Natural Order.—Zingiberaceæ.

Characters.—The scraped and dried rhizome of Zingiber officinale exists in flattish irregularly-branched pieces, ordinarily from about three to four inches in length. Each branch is marked at its summit by a depressed scar.

Externally the colour is pale buff. The substance is somewhat striated and fibrous, and breaks with a mealy, short, but rather fibrous fracture. The odour is agreeably aromatic, the taste strong and pungent.

Preparation :—

Tinctura Zingiberis Fortis (10 ounces to 1 pint).

Therapeutics.—Ginger is aromatic, carminative, tonic, stomachic, and somewhat irritant. It is often employed with other remedies as a mild tonic and appetizer after debilitating diseases, and is sometimes given with purgatives to diminish their tendency to cause griping. In indigestion ginger acts as a useful carminative, and is often prescribed with other remedies given for this disorder.

Posology :—

Horses ...	...	...	½ to 1 ounce.
Cattle ...	...	...	1 to 2 ounces.
Sheep ...	...	...	1 to 2 drachms.
Pigs ...	...	...	½ to 1 drachm.
Dogs ...	...	...	10 to 20 grains.

ADDENDUM.*

PSORALEÆ SEMINA.

Psoralea Seeds.

Natural Order.—Leguminosæ.

Habitat.—India.

Description.—The ripe seeds of Psoralea Corylifolia, the local name for which plant is Bawacho, Babchi, Bakchi, or Karpo Karischi, are oblong and flattened, and of a rough dark brown appearance. The testa is from about 2 to 2½ lines in length. They have a faintly aromatic unctuous smell, and a somewhat bitter taste; and contain oil, tannin, a resin and a bitter principle.

Therapeutics.—The action of psoralea seeds is laxative, stimulant and aphrodisiac. They are used in India by the lepers in combination with chaulmoogra, for which, as for other chronic skin diseases dependent upon general disturbance of the system, they are strongly recommended. The seeds are used by the Hindoo ladies as a remedy for loss of hair. The liniment, prepared by Messrs. Corbyn, Stacey and Company, has been employed with highly satisfactory results in cases of loss of hair arising from saddle-galls, broken knees, etc.

* From notes kindly supplied to us by Mr. C. H. Huish.

Preparations.—*Tinctura Psoraleæ*, made thus :—Take of

Powdered Psoralea Seeds, $1\frac{1}{4}$ ounce ;
Rectified Spirit, 1 fluid pint.

Macerate the powdered seeds with 16 fluid ounces of the rectified spirit for four days, then pack in a percolator, and when the mixture ceases to drop, add the remaining 4 fluid ounces of rectified spirit ; press, add sufficient rectified spirit to make 1 pint of product, and filter.

Linimentum Psoraleæ, made thus :—Take of

Tincture of Psoralea, 1 pint ;
Gynocardic Acid, 600 grains ;
Solution of Hydrate of Potassium, 1 fluid ounce ;
Tincture of Quillaya Bark, 12 fluid ounces ;
Glycerine, 8 fluid ounces ;
Distilled Water to make 8 pints.

Melt the gynocardic acid over a water-bath, and saponify by the addition of the solution of hydrate of potassium ; then add the tincture of quillaya, and afterwards the glycerine and tincture of psoralea.

Finally, add the water in small quantities at a time with vigorous agitation.

THE END.

Baillière, Tindall & Cox, 20, King William Street, Strand.

WORKS BY MESSRS. GRESSWELL,

OF LOUTH, LINCOLNSHIRE.

ON VETERINARY SCIENCE.

A MANUAL OF THE THEORY AND PRACTICE OF EQUINE MEDICINE. 10s. 6d. London: Baillière, Tindall, and Cox. 1885.

THE VETERINARY PHARMACOLOGY AND THERAPEUTICS, with an Index of Diseases and Remedies. By JAMES BRODIE GRESSWELL, M.R.C.V.S. 5s. London: H. K. Lewis. 1885.

THE EQUINE HOSPITAL PRESCRIBER. 2s. 6d. London: Baillière, Tindall, and Cox. 1886.

DISEASES AND DISORDERS OF THE HORSE: A TREATISE ON EQUINE MEDICINE AND SURGERY, being a contribution to the Science of Comparative Pathology. 5s. London: Baillière, Tyndall, and Cox; Leeds: *The Yorkshire Post.*

THE VETERINARY PHARMACOPŒIA, MATERIA MEDICA, AND THERAPEUTICS. London: Baillière, Tindall, and Cox. 1886.

THE BOVINE PRESCRIBER. London: Baillière, Tindall, and Cox (*shortly*).

ON THE EVOLUTION THEORY.

THE WONDERLAND OF EVOLUTION. 3s. 6d. London: Field and Tuer. 1884.

THE EVOLUTION HYPOTHESIS. 2s. Cape Town: Messrs. Darter Brothers and Walton. 1885.

SOME PATHOLOGICAL BEARINGS OF DARWINISM. 1s. By Dr. D. Astley Gresswell, B.A., B.M., Christ Church, Oxford, M.R.C.S. 1886.

THEOLOGY, MUSIC, POLITICS, EDUCATION AND FICTION.

ANALYSIS OF WATERLAND ON THE EUCHARIST. By the Rev. H. W. Gresswell, M.A., Oxford. 1s. London : James Nisbet and Co. 1886.

ATHEISM. By the Rev. H. W. Gresswell (*shortly*).

HOW TO PLAY THE FIDDLE; or, HINTS TO BEGINNERS ON THE VIOLIN. 1s. London : Field and Tuer. 1886.

RATIONAL POLITICS. By Charles Gresswell. 3d. Nottingham : Thos. Forman and Sons. 1885.

THE PLACE OF PHYSICAL SCIENCE IN EDUCATION. By George Gresswell. 1s. Cape Town : J. C. Juta. 1884.

HOPE AND DESPAIR. A Novel, by George Gresswell (*shortly*).

ON HUMAN MEDICINE.

A TREATISE ON HUMAN THERAPEUTICS. By Dr. Albert Gresswell, B.A., B.M., Christ Church, Oxford, M.R.C.S. (*shortly*).

DIPHTHERIA AS A CHRONIC MALADY IN PARTICULAR INDIVIDUALS, WITH LIABILITY IN THEM TO RECRUDESCENCE. By Dr. D. Astley Gresswell.

Author Greenwell, Albert 65686 MV
Title Veterinary Pharmacopoeia 9.

University of Toronto
Library

DO NOT
REMOVE
THE
CARD
FROM
THIS
POCKET

Acme Library Card Pocket
Under Pat "Ref. Index File"
Made by LIBRARY BUREAU